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LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CXLVII. No. 2929.] LONDON, JULY 1, 1919. [71ST YEAR. PRICE 8d.

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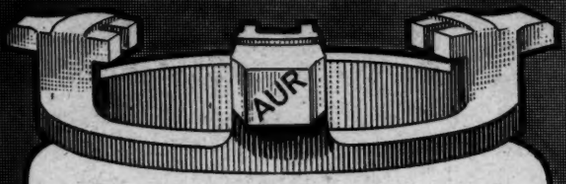

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CXLVII., No. 2929.] TUESDAY, JULY 1, 1919. [71ST YEAR.

PEACE AND WORK.

THE Peace Treaty has been signed at Versailles, after four-and-a-half years of terribly destructive war, and six months of the acutest suspense as to what might happen. The formal signing of the treaty is only the beginning of the last long chapter of settlement for the crime of starting the war, and for the indescribable acts, repugnant to every sense of humanity, that have marked its conduct by those who have been our enemies, and which acts we can neither forget nor forgive. All associated with the British gas industry unite in the rejoicings of the allied nations over the achievement of a peace full of hope for the future; and with the deepest fervour each one having place in the industry can repeat the words of His Majesty the King: "I join you all in giving thanks to God." We congratulate our friends of the gas industries of France, Belgium, Italy, America, Japan, and of the other countries that have been united with the British Empire in a great and righteous cause. Every one of these industries has made great sacrifices, and has done its share in bringing to a successful termination the tremendous issues over and around which the great conflict was waged. A long period of reconstruction and development is now before each country, and on the work there must be an immediate and earnest concentration. In this work, the gas industry of each country, being essential to the fullest national progress, has to do its large part. Upon the British gas industry there is a supreme measure of responsibility. Let us work well to repair, as far as possible, the evil that has overtaken the industry through the war, and to re-establish solidly and firmly its foundations—and all with the view to a still more conspicuous service, progress, and prosperity.

Nationalization: Is it Reconstruction or Destruction?

THE country is being aroused at last to the great danger with which it is confronted. The Ways and Communications Bill was the first pronounced indication that the Government, moved by a section of the labour extremists, were heading for nationalization of privately financed and operated enterprises. When there was trouble with the railwaymen, the Government promised the nationalization of the transport systems of the country; and, pressed also by the railwaymen, they hinted at electricity generation being taken over on some national basis. What is being done in these directions is seen by the Ways and Communications Bill and the Electricity Supply Bill. The Government, it is plain, are simply acting under labour coercion; and so much are they under its influence that, when a large number of members of the House of Commons expressed their intention of uniting in opposition to the Ways and Communications Bill, the Leader of the House threatened to resign if there was success in producing defeat. What has happened is well known. Some modest amendments have been made in the Bill; but in no sense have the principles and main purposes embodied in it been affected. When the electricity clause was removed from the Bill, it was quite frankly stated by the Government that this was only done as a matter of expediency, and that their scheme of centralized electricity generation would eventually come under the new Ministry, as it was regarded as an integral part of the scheme. Provision was made for this in the Electricity Bill. Now we have the nationalization reports of the Coal Commission. When the Government appointed the Commission, they practically pledged themselves to the miners to accept its recommendations, whatever their nature.

On the question of the nationalization of the coal industry, Mr. Justice Sankey has reported in favour; and he is supported by a strange coterie of extremists—Mr. Smillie, the various other representatives of the miners, and those airy theorists, Chiozza Money and Webb. This, therefore, becomes a majority report; and the Government are firmly pledged to support it. The knout that the Government fears is in the hands of the Triple Alliance—miners', railwaymen's, and the transport workers' Unions, or rather in the hands of the extremists of those bodies who have linked-up for militant purposes. What we are coming to was all too well exemplified at the conference of the labour party at Southport last week, when there was some discussion as to using the strike weapon for political purposes. The meaning of this is that labour should attempt to supersede constitutional political action by utilizing the strike weapon to enforce their decisions, although these may be opposed to the decisions of the nation or of its elected representatives. Labour, however, has a strong body hostile to employing direct action for political ends; and that body made itself felt at the conference. Nevertheless, a resolution was duly passed affirming the principle of the right to strike to enforce political aims. Mr. Smillie intimated that the miners have made up their minds to strike if they do not get nationalization, which is a blunt way of saying that the miners arrogate the position of dictators in a matter of purely national policy. The Government appear to have been thoroughly cowed by the labour extremists; and the only mandate they have in respect of nationalization is that of these extremists.

That is the position; and it is admittedly a serious and an ugly one. Syndicalism is at the helm; and not the Government. That is pretty clear. The Government have been coerced; and the Government coerce the House. When we come to such conditions, then it is time for the country to wake up, and to move quickly. The country is moving; and the gas industry should not be behind the rest in subscribing its protest against this wave of nationalization and the wholesale suppression of private enterprise. Where it is leading to, no one can definitely foresee; but any and every test that can be applied indicates national handicap and final disaster. When Mr. Justice Sankey appended his name to a report favourable to the nationalization of coal mines, and which the country says is opposed to an overwhelming weight of evidence against nationalization, he did something the effect of which may have serious conse-

quences not limited to the coal industry, though the gravity of that would be enough. He did something that will be inimical to the whole of our national economic structure. He did this in company with Mr. Smillie, Sir Leo Chiozza Money, Mr. Webb, and others. What must Mr. Justice Sankey think to-day when he contemplates the plans that are supported by the cherished opinions of a group of ultraists, and then glances outside and sees the men who have made the industrial life of England what it is—men of intellectual capacity and judgment, and unequalled experience in industry and commerce—rising from all quarters of the United Kingdom to condemn his work, and protest against a policy which will surely enfeeble the country, its industrial power, and individual enterprise and initiative? Mr. Justice Sankey has been presiding over a tribunal the greater part of the evidence before which pronounced against the very action which he recommends; a greater tribunal sits to-day in judgment upon Mr. Justice Sankey's report, and there is a condemnatory voice, the unanimity of which is only disturbed——by whom? Let him and the Government weigh-up the one side and then the other. Let them examine fully the strength of the men (intellectually and otherwise) who have expressed and are expressing convictions strongly hostile to the creation of State monopoly and the extinguishing of any part of private enterprise, and then make comparison with the strength of the case put forward by those to whose behests the Government are making such favourable response. The result should be a salutary lesson.

It might be pleaded by Mr. Justice Sankey that the working of the mineral properties of the country stands in an altogether different category from any other form of enterprise, and that his recommendation that the principles of State ownership of the mines should be accepted must not be interpreted to mean that he is sympathetic with nationalization as a general policy. This may up to a point be a very good submission. But the influence of the decision cannot stop there; and the fact that Mr. Justice Sankey has gone with Mr. Smillie and his associates the full length of the road to nationalization indicates that he at all events was incapable of conceiving any other course that could bring about co-ordination of working in the coal mines, strengthen control, extend representative administration, and yet keep within the industry all those factors that are conducive to enterprise, initiative, and economic success. In this matter, the country will reject any attempted justification on political grounds, and will only consider justification on economic grounds. And there is no justification of this nature to be found in the report. The coal-mine nationalization scheme—like the transport projects—are not small things; and the commitments and obligations which will fall upon the country through the Government are absolutely unknown quantities. There are no mature schemes before us. It is all a blind leap in the dark. There appears to be a great favouring of experimental periods—not for the purpose of deciding whether or not nationalization will be detrimental to the interests of the country, but a period during which there may be experimental administration before nationalization is brought to a full head. It is proposed by Mr. Justice Sankey's report that for three years the coal mines shall be run under a scheme of local administration, with the aid of the Coal Controller's Department. Sir Eric Geddes wants a couple of years in which to fashion his transport plans. So that in both directions nationalization is going forward, and is to be the certain result (unless, fortunately, an end is put to the schemes by Parliament and the country), though no proper investigation has been made as to what it all means in respect of our national economic position. With men who will proceed thus, no industry can hope to be safe.

All the reports favour a Ministry of Mines—whether there be nationalization as proposed by the Sankey-Smillie report, or a larger measure of control of the existing coal interests as suggested by the coalowners, or an amalgamation of colliery interests and unification of working in each area, and the institution of statutory companies to be known as District Coal Boards, as proposed by Sir Arthur Duckham. All, too, provide for the miners taking part in the administrative work. But the Sankey report suggests a vast machinery of local mining councils, district mining councils, and a national mining council, the crown of all which would be the Ministry of Mines. There are indications of some fear in Mr. Justice Sankey's mind that, unless deliberately legislated for, all the old troubles and defects of bureaucratic control will creep in with nationalization. There is no doubt in our mind that the fear is well-founded; and that, when once the mines are nationalized, the barrier that he suggests—all responsibility being put on to the shoulders of men trained in the industry, and not on those of the usual run of civil servants—will soon be broken down. There are many matters upon which opinions vary in the reports. Differences of opinion exist as to whether composite undertakings—coal and steel works, or coal and coking, bye-product, and chemical works—should all be nationalized or separated. If nationalization of coal mines is accepted by Parliament, then it should not extend to what are essentially separate industries. It is seen, too, that the Commissioners are anxious there should be a full inquiry to ascertain where the responsibility actually lies for the reduction in the output of coal.

Looking at the matter as a whole, there does not appear, whatever scheme is adopted, to be anything to encourage the idea that the price of coal will be reduced; and least of all under State ownership. It is suggested by Mr. Justice Sankey that in fixing the pit-head price of coal under State ownership, the following items shall be provided for: A fair and just wage for all workers in the industry; the cost of materials, &c.; the upkeep, management, and development work; interest on the bonds to be issued as the purchase price of the coal royalties and coal mines; a contribution towards the sinking fund to redeem the bonds; and a profit for national purposes. There will also be considerable cost incurred by the machinery it is proposed to set up. But the coal industry is described as the chief of key industries upon which all other industries depend. Then why make a profit out of the coal for national purposes? No one can rise from a consideration of these reports without a feeling that these nationalization schemes spell jeopardy for the interests of the country, and will create a feeling of unrest that will undermine the great prosperity for which all have been looking when war ceased and peace again reigned. Are we entering upon a period of reconstruction or one of destruction?

Of Peculiar Current Interest.

THE minutes sent out for publication by the National Gas Council have about them a brevity which, from the present point of view of the publisher of a journal such as this, is commendable, in view of the cost and difficulties associated with paper and printing. But the brevity sometimes obscures information about which there is an earnest longing to know more. In relation to the calorific standard, the time of protection given to the industry by the last Board of Trade circular-letter has in reality expired; and the Council have been in conference with the Board of Trade on this and other subjects. But, in the minutes published elsewhere this week, the Council do not even give a hint as to the result. This we take it is due to a feeling on the part of the Council that the official announcement by the Board should be the first public intimation. But it is easy to read between the lines of the Council's minute. In view of the coal position, the Board of Trade, we are told, will shortly be issuing a letter on the subject of the calorific standard of gas, which notification should be sufficient to remove any uneasiness that may exist, seeing that, if it was only a question of the *status quo ante bellum* being restored, there would be no occasion to send out a further letter.

Then there is the position of the gas industry in relation to the Electricity Supply Bill, which makes proposals that are not altogether in harmony with coal conservation, and therefore not with the interests of the gas industry. The gas industry has had sufficient difficulty during the war and through the war, owing to restricting legislation that is incompatible with the newly established conditions; and it is not by any means anxious that its burdens should be made heavier by preferential facilities being accorded to its chief competitor in the mistaken belief that it has some inherent superiority, to which plain facts give an absolute denial. Sir Auckland Geddes, the President of the Board of Trade, is receiving a deputation from the Council on the subject, as well as in connection with financial hardships, which time makes harder and harder to bear. The position of the industry, and of the investors in it, is both unreasonable and unjust; and it would be a poor intelligence that could not appreciate this. We are looking hopefully to a business Parliament dealing with the matter in an honest business way. It is also seen that the Council have taken legal opinion upon section 2 of clause 15 of the Electricity Supply Bill, to

which attention was directed at the bottom of p. 425 of the "JOURNAL" for May 20; and they are advised that no restriction appears to be imposed by the Bill on the powers of a District Electricity Board to supply gas, other than the necessity of obtaining the consent of the Electricity Commissioners. An amendment of the clause is naturally being sought. In artfulness was this great electrical reformation business conceived, by seductive means it was pushed forward, and this innocent looking clause was no doubt destined as a large outlet for subsidiary business if the opportunity for it could be found. But however conceived and reared, the scheme which the Bill encloses has grown into something exceeding what the electricity industry desired.

Board of Fuel Research Report under Discussion.

THE first open discussion by a body of gas engineers of the report of the Board of Fuel Research to the Board of Trade took place last week at Ossett, when the members of the Manchester Institution of Gas Engineers visited their President (Mr. A. E. Mottram), and were the heartily-welcomed guests of the Gas Committee. There are two main points about the Fuel Research report which should be borne in mind. The one is that never before have affairs of such vital importance to the gas industry been considered by such an independent and competent tribunal; and the other that the report itself—of inestimable value to the industry—goes no further than recommending the course that should be pursued in future legislation, in order to permit the industry to render larger service to the country, and at the same time to aid in the conservation of its fuel supplies, as well as to produce for the nation the maximum possible of the intrinsic value of the coal used. People appear to forget that carbonization is a means of releasing and separating the hidden blended valuables of coal, and that carbonization must go on, and must be encouraged on the broadest and most enlightened lines, if England is to maintain her place in economic progress. This was present in the minds of the members of the Board of Fuel Research. Their knowledge of what is required of coal, and the best means of realization, is traceable in almost every line of the capital parts of the report. Hence it is that from Mr. John Bond's opening, through Mr. Tim Duxbury's supplement, and to the end of the discussion at Ossett, there was acknowlegment of the friendly feeling towards the industry that the report conveys. But let us say emphatically that the report would never have been made by men of the scientific calibre of Sir George Beilby and his associates alone because of any friendly feeling towards the gas industry. It was made because, knowing what they do about the utilization of coal, they are persuaded that the processes of the gas industry tower in economic advantages above all other methods of utilizing the country's bituminous fuel resources; and therefore they conscientiously recommend the Government, through the Board of Trade, to give the best possible facilities for the development of the industry's processes and trading.

What are the facilities they recommend? There is the freedom from a prescribed parliamentary standard. It has always been a mistake, but Parliament would never before see it, to tie-up every gas undertaking in the United Kingdom —no matter its local conditions, and the character of raw material, plant, and demand for its commodities—to one calorific value stake. The Board now propose that fixed statutory standards shall be discarded, and that there shall be a selection by a gas undertaking itself of a minimum calorific value, which may be subject to periodical conditional change. In the discussion, there was no recognition of the connection there is between this proposal and the one that the future charge for gas shall be based upon the heat units supplied. There was full endorsement of the views of the Board on the point of liberty in the local selection of the minimum calorific value of the gas to be supplied; and this carries with it the obligation to charge on the heat unit basis, to which again there is no objection. The refusal to adopt the heat unit system of charging, it seems to us, would result in the continued imposition of statutory restrictions, which are not wanted in the interests of technical and commercial development. Mr. Bond points to one matter of doubt. It is that the supply of a quality of gas below the declared minimum calorific value would result in a penalty being inflicted; and, of course, it would be a fraudulent act to charge for B.Th.U. that were not delivered. But what about the B.Th.U. in excess of the minimum? Are the gas suppliers to be paid for this additional value, or are they not? It seems to us that the fairest way would be to allow suppliers to charge on the average shown by the official tests—say, during a quarter. The point is one which will no doubt be settled in discussing the report with the Board of Trade, who, there is no question, are as genuinely anxious to get the gas industry on a proper basis as is the industry itself. For the present position of an industry with processes so fundamentally correct is a reflection more upon the Legislature than upon the industry itself.

Those taking part in the discussion at the Ossett meeting were very emphatic on the fact that by the restrictions that are subsidiary to the main recommendations, the Board of Fuel Research are making propositions that will largely neutralize the beneficial effects in service that they are desirous of seeing produced. There is the low 12 p.ct. of inerts condition. Practically the whole of the technical men of the gas industry are opposed to this as an unnecessary restriction, in view of both practical experience and the disclosures of the reports of the Gas Investigation Committee. For purposes where flame temperature is necessary, and for certain metallurgical uses, an excessive supply of incombustibles is not desirable; but, in their own interests, gas undertakings would not be so foolish, when the Coal Controller sees fit to ensure supplies of proper coal, as to kill business by supplying something that is undesirable. In urging that, charging on the potential heat unit basis, there could be freedom in respect of inerts, Mr. Bond remarked that it has been "conclusively proved by scientific investi- "gation that greater efficiency in the illuminating power of "the incandescent burner is obtained by lower grade gases "containing a higher percentage of inerts." Where, we venture to inquire, are the results of these scientific experiments to be found? Mr. Bond is a member of the Gas Investigation Committee, and in connection with the lighting tests in their first report, it is declared that "the results "show, without doubt, that a gas of low calorific value and "high inerts is more difficult to manipulate than, and "does not give such good results as, a gas of low calorific "value, but mainly of combustible matter." This statement is emphasized in the conclusion: "Gases of low calorific "value and high inerts were found to be distinctly inferior, "on all grounds, to gases of similar low calorific value but "low inerts—*i.e.*, consisting mainly of low-grade combus- "tible matter." We do not see in the report that Mr. Bond dissociated himself from the finding. While pointing this out, we are totally opposed to the industry being fettered with a 12 p.ct. limitation of inerts, which would in numerous cases take away with one hand the good that is offered by the other—thus defeating the real intentions of the Board of Fuel Research. The proposal as to 2-inch minimum pressure applying to the boundaries of, and nooks and corners in, a district of supply is not acceptable, though there would not be, in most of the inner areas of gas undertakings, any difficulty in complying with the stipulation. As to the objectionable proposal regarding sulphur compounds other than sulphuretted hydrogen, the President intimated that there was a likelihood of this suggestion being withdrawn.

We are sure the members of the Board of Fuel Research will read with considerable interest the views expressed at the meeting. They will realize that these views are of men operating in the great industrial areas of the country, and that they fully confirm the opinions of those who have spoken on behalf of the National Gas Council. We may assure the Board that the views they have heard and read on these matters are indicative of those that are very generally held in the industry.

Street-Lighting Reformation.

AMONG the people who deserve well of us at the present time are the illuminating engineers who are striving for the application of more scientific principles, so as to secure the highest possible refinements of illumination, and the elimination of defects. They see the time is opportune now with reconstruction in the air, and not only in the air but in certain directions materializing, for urging the authorities responsible for the lighting of the streets to mend their old ways, and to produce something more in accordance with contemporary knowledge of what things should be. But those who preach reformation, and teach the doctrines of scientific practice, must not expect an immediate return for

their labours, by seeing the irregularities of the past at once suppressed, and their conceptions in actual being. Local authorities for the most part are doggedly persistent. They believe they already know what is correct and what is sufficient in their streets; and so the truth must be gradually worked home. If they make changes, perhaps it is because the electricity station is in their keeping and under their direction. And so they put those exasperatingly flickering flame arc lamps, with their bad capacity for light diffusion, on high pillars, or swing them over the centre of the roadway, to the discomfort of drivers of high trolley cars, and with a patchiness of light and moving shadows on the road surface. In such cases, there is no great concern for the safety of the public. It should be safety and maximum efficiency for purpose first, and not electricity station first. If the same local authorities change from flame arc lamps (as is the modern custom), they put in gas-filled electric lamps, and leave their highly incandescent filaments exposed to do their best in degrading the organs of vision of the public. But all local authorities are not as these. There are others, some of whom adopt more sensible methods. But the gross result is a great disuniformity in the lighting of areas, which would be largely avoided if a comparatively few basic principles were generally adopted. The time is one for education rather than an immediate change.

This was apparent from the discussion which took place at the meeting of the Illuminating Engineering Society on Tuesday last—a discussion opened by Mr. L. Gaster. The local authorities, as Mr. F. W. Goodenough on the occasion remarked, are not likely to embark upon increased expenditure in improving street lighting while every cost that contributes to the whole stands where it does to-day. The fact gives time for educational propaganda. The authorities can be taught that greater uniformity of illumination is desirable as between districts by common agreement—not such uniformity that the illumination of one part of a street is on an exact parity with that of any other part. This would only be monotonous. But there should be an attempt to put equal illuminating value in streets of like importance, and to maintain in them a good minimum illumination. With a good minimum illumination, the maximum will not matter so much, providing it is not excessive. That would mean waste. Again where central lighting is in use, in order to neutralize the shadows which fall upon the kerbs, and set up danger to pedestrians, there should be staggered sidewalk lamps. Also where there are high-power lamps in main streets, and low-power ones in side streets, a gradation of lighting in the side streets should be adopted, so that there is not sudden transition from high-power to low-power lighting, or *vice versâ*. The importance of streets, too, must not be judged solely by their width, or by the fact that they are side-lined by shops. In London many narrow and unimportant-looking streets leading to railway termini have fast moving traffic in them at all times during hours of darkness, and should therefore in all cases be thoroughly well lighted.

Another important point is that lamps of high intrinsic brilliancy should be properly screened, irrespective of their candle-power, unless placed well out of the line of vision of both pedestrians and the drivers of vehicles. Mr. Gaster is strongly of the view that there should be screening of all high-power lights; but Mr. Goodenough is of opinion that there is no need to screen lamps below 250 to 300 candle power. For our own part, we think that judgment as to whether or not there should be screening should be based upon the intrinsic brilliancy of the sources of light. Consider the intensity of the filaments of a gas-filled lamp. According to Mr. F. W. Willcox, it is equal to 3000 candle-power per square inch of surface, while that of a low-pressure inverted gas-mantle is about 20 to 35 candle-power per square inch. Which of these two lamps, unscreened, is likely to do the greater damage to the organs of vision? Which, therefore, is the lamp which it is most desirable to screen? There is no room for any dispute; and fair-minded electricians acknowledge this. Another point made is that there should also be control of the lighting of shop windows, so that all the illumination is directed into the windows and on to the goods, and permit the street lighting to maintain as near as possible an approach to independence—more especially seeing that the shop lighting is only temporary, and, under pre-war conditions, it contributed to patchy lighting and vulgar display, which put the eyes of pedestrians to a test of accommodation which those delicate organs were not constructed to fulfil.

Jubilee Issue of "Field's Analysis."

By the present issue of "Field's Analysis," this standard work reaches its jubilee. Its reliability has always been accepted and acknowledged in parliamentary and arbitration proceedings, and in the Law Courts; and the work of successive compilers—now Mr. H. E. Ibbs, the Chief Accountant of the Gas Light and Coke Company—has been of inestimable service to the gas industry generally. A special article regarding the "Analysis" for 1918 appears on a later page of this number of the "JOURNAL;" and some interesting comparisons are made covering the period of issue.

Spread the Gas-Fuel Idea.

The latest report of the Executive Committee of the British Commercial Gas Association shows that the work of this body as a circulating vehicle is increasing. When the distribution work enlarges that a vehicle is called upon to do, naturally the costs become heavier. One of the directions in which the Association has a lot of work to cope with just now, and consequently heavy responsibility, is in connection with the place occupied by the gas industry (which is to-day fighting for its rightful position) in relation to coal conservation as compared with the electricity industry. There has of late been quite a crop of matter on this subject to digest, print, and circulate in right quarters; and the resulting harvest of extending knowledge should be great. The Executive Committee realize that an important part of their mission is to assist to get firmly into the minds of the public generally and parliamentary and local authorities particularly, that gas is the fuel of the future. Sedulous prosecution of this work is proceeding.

Gas Heating and Structural Economy.

This is a subject that has been prominent at the recent District Conferences of the Association. Mention is made of the matter in the report of the Executive Committee. It is obvious that if chimneys, chimney breasts, and all the structural work associated with coal heating can be eliminated, a considerable saving will be effected in building costs, as gas only requires small flues in the walls. It is also clear that the floor space and cubical capacity of rooms will be enhanced. Some actual figures on the subject were given at the Edinburgh Conference by Major F. Cornelius Wheeler, F.R.I.B.A.; and they will be found in the "JOURNAL" for June 17 [p. 751]. These figures, which have been confirmed by Mr. Swain, the Architect to Messrs. Rowntrees, may have been overlooked in the mass of other matter by readers who are specially interested; and it is really an important point, in view of the increased costs of installation to-day, against which these economies must be set.

Meters, Stoves, and Fittings.

It is seen that the National Gas Council have appointed a Special Committee to consider the course it is desirable to pursue in regard to the increased cost of meters, stoves, and fittings. Concerning the supply of meters, the Right Hon. Sir Daniel F. Goddard, at the meeting of the South African Lighting Association, Ltd., mentioned that a good many more meters might have been connected up at the Company's seats of operation at the Cape could they have managed to secure them. But willing as they were to buy, they could not obtain. However, as pointed out by Mr. F. R. Smith (Messrs. Parkinson and Cowan), the difficulty cannot be placed entirely at the doors of the meter makers. The Government put an absolute restriction upon the export of gas-meters; and therefore, from this point of view alone, it was impossible to supply. Now the situation has changed; and the difficulty no longer exists. There is the assurance of Mr. Smith that more liberal supplies will now be available both for home and overseas use.

Appropriating Published Information.

It is a pity when authors of papers appropriate published information without due acknowledgment. There may, of course, be genuine oversight; but it is difficult for an author, who has made quotation without permission and acknowledgment, to satisfy other people that the omission to do so was quite accidental. In the paper that Mr. James Smith read at the Colwyn Bay conference of the "B.C.G.A., he, under the cross-heading,

"Boiler on Usual Circulating System," "lifted" without acknowledgment several paragraphs from the special article contributed to our columns, on "Gas for the Housing Schemes," by the Richmond Gas Stove and Meter Company, Ltd. The article appeared in the "JOURNAL" for March 4; and it was composed of information which, we know, involved a considerable amount of trouble and expenditure of time on the part of our contributors. Credit in these matters should always be given where credit is due.

PERSONAL.

Alderman J. H. LLOYD has accepted the chairmanship of the Gas Committee of the Birmingham Corporation. He has for many years been Chairman of the Works Sub-Committee, and since the retirement of Sir Hallewell Rogers, M.P., has been Acting Chairman of the Committee.

OBITUARY.

Canada has had the misfortune to lose one of her best-known gas men, by the death, on May 18, at Halifax, of Mr. WILLIAM HENRY SOPER. He was born in this country—at Newton Abbott—in 1847, and went half-a-century ago to Halifax (Nova Scotia), where at the time of his death he had just completed 43 years' service with the Gas Company, of which he gradually rose to the position of Superintendent.

"B.C.G.A." Annual Conference and General Meeting.

We are asked to emphasize the statement made in the report presented to a meeting of the General Committee of the "B.C.G.A." last week (as mentioned on another page), to the effect that the Executive Committee have arranged to hold the annual conference and general meeting of the Association on Tuesday and Wednesday, Oct. 28 and 29. As this promises to be a conference of the greatest importance to the industry, and in which prominent authorities will take a leading part, members will be well-advised to reserve the dates mentioned.

Iron Retort Carbonization.

The Greene-Laucks coking process, referred to in last week's "JOURNAL," p. 806, is a continuous one, with never more than 250 lbs. of coal in a retort at any one time. The capacity of each retort is about 25 tons of coal per 24-hour day, or 100 tons per battery. The speed of the treatment is adjustable within limits, so as to govern the volatile content of the coke. It is said to be possible to make either a metallurgical coke containing 2 p.ct. of volatile matter, or a high-grade domestic coke with 10 p.ct. It is claimed that the gas evolved amounts to from 4000 to 6000 c.ft. per ton of coal treated, of a value of as much as 700 B.Th.U. Approximately one-half of this is consumed in coking. Of sulphate of ammonia there are some 20 lbs. per ton of coal treated. As to the liquids extracted, a fair average for Colorado or Rocky Mountain varieties will show a yield of: Light oils, 3 gallons; carbolic oils, 6 gallons; and creosote oils, 12 gallons. Runs recently made at the Denver plant showed that 77 p.ct. of the oils given off were aromatics; while the creosote obtained was equal in quality to that secured from fine tar.

Spontaneous Combustion of Coal.

The subject of spontaneous combustion, mainly in reference to ships' cargoes, was dealt with by Mr. Watson Smith, F.C.S., F.I.C., in the "Journal of the Royal Society of Arts." He remarks that air-shafts through the masses of coal on board ships, for the purpose of ventilation, were found by sad experience actually to favour the tendency to outbreaks of combustion; for of four vessels carrying coal to India, three thus well ventilated were lost by fire outbreaks, while the fourth, not so ventilated, reached its destination in safety. With reference to the firing which sometimes occurs on land, having this in view, the height of a coal-stack ought not to exceed about 7½ ft. The only way to diminish the danger of coal gas explosions is to be found in surface ventilation, by passing a current of air over the coal, and leading it directly into the open. The extinction of burning cargoes of coal by means of carbon dioxide a British Commission of Inquiry some thirty years ago held to be impracticable, as this gas has no cooling effect. The Commission were far more inclined to favour the employment of water and steam in cases of large masses of burning coal. Liquid carbon dioxide was for a time recognized in this country as an efficient agent; but trouble occurred in its manipulation. The article points to the need of further investigation.

Restoration of the Twelve Million Cubic Feet Holder.—In Mr. H. Townsend's paper on "Some War Experiences of British Gas Undertakings," read at the meeting of the Institution of Gas Engineers, he described the damage done by the Silvertown explosion to the 12 million cubic feet holder of the East Greenwich works of the South Metropolitan Gas Company. The work of restoration has been in the hands of Messrs. Clayton, Son, & Co. We hear that the holder is now being tested under air.

THE JUBILEE OF "FIELD'S ANALYSIS."

Issue for the Year 1918.

THE publication of "Field's Analysis" of the accounts of the principal gas undertakings for the year 1918 marks the jubilee of this work.* For fifty years analysis after analysis has made its appearance; and an historical record of the principal gas undertakings has thus been furnished which would not otherwise have been available.

The series of annual publications records the various developments in the industry from the free issue of capital to the restraining and beneficial influence of the auction clauses; the change-over from dividends not restricted by price to the limitations imposed by the sliding-scale; the introduction of automatic meters; the different methods of manufacturing gas in conjunction with water-gas; and, more recently (with a significance not to be denied) the gradual substitution of calorific power for illuminating power. A further peep into history can be obtained by reviewing the working costs per 1000 c.ft. of gas sold of an undertaking over the fifty years, by which are revealed the effects of coal strikes and war periods—culminating during the last five years in a result never anticipated by the gloomiest pessimist of olden days.

The latest figures—those of 1918—will naturally cause no surprise to gas officials, as by now everyone is accustomed to high figures; and no alarm is felt at the prodigious and lavish expenditure of money, and its consequent reflex in the increased price of gas. It is only when a comparison is made with some of the other years in the half-century covered by the work that a full realization of the tremendous change that has occurred is brought to one's mind. With all this change, however, it is well to pause and inquire what material alteration, after all, has been effected. The answer to this will be found in the gradual and consistent increase that is shown in the output of gas, allowing for the temporary set-back recently brought about by the Household Fuel and Lighting Order. Leaving costs therefore out of the question for the moment, the gas sold and the return to the shareholders provide the real indices to the progress or otherwise of the industry.

NOTABLE COMPARISONS.

It will be interesting to give a few comparative figures over the fifty years; and for this purpose groups have been selected rather than individual concerns, as thereby any temporary or exceptional fluctuation due to unusual circumstances is averaged. The figures are as follows for the

Metropolitan Gas Companies.

	1869.	1880.	1900.	1918.
Capital employed per 1000 c.ft. sold	15s. 10d.	14s. 5d.	11s. 1d.	10s. 9d.
Coal carbonized, tons	1,171,588	1,898,474	3,249,955	3,193,195
Gas sold, thousands	9,885,857	18,091,263	34,508,749	42,756,370
Net gas-rental per 1000 c.ft. sold	4s. 0·41d.	3s. 3·38d.	2s. 10·07d.	3s. 9·91d.
Net coal and working expenses per 1000 c.ft. sold.	2s. 5·75d.	1s 9 80d.	2s. 0 64d.	3s. 6·41d.
Dividend paid per 1000 c.ft. sold.	1s. 2·57d.	1s. 2·03d.	8 96d.	5 66d.
Number of undertakings	(13)	(4)	(3)	(3)

Provincial Companies.

	1883.	1900.	1918.
Capital employed per 1000 c.ft. sold	12s. 3d.	9s. 2d.	7s. 11d.
Coal carbonized, tons	871,301	1,063,823	1,573 544
Gas sold, thousands	8,061,247	10,835,937	19,736,252
Net gas-rental per 1000 c.ft. sold	2s. 6·39d.	2s. 1·79d.	2s. 9·46d.
Net coal and working expenses per 1000 c.ft. sold	1s 8·24d.	2s. 6·24d.	2s. 7·41d.
Dividend paid per 1000 c.ft. sold	10·03d.	6·70d.	4·19d.
Number of undertakings	(10)	(8)	(9)

Provincial Corporations.

	1883.	1900.	1918.
Capital employed per 1000 c.ft. sold	14s. 8d.	10s. 1d.	9s. 7d.
Coal carbonized, tons	1,039,541	1 881,318	2,516,323
Gas sold, thousands.	9,339,169	18 892,155	31 405 399
Net gas-rental per 1000 c.ft. sold	2s. 5·30d.	2s. 3·04d.	2s. 7·12d.
Net coal and working expenses per 1000 c.ft. sold	1s. 3·39d.	1s 7 50d.	2s. 0·25d.
Number of undertakings	(8)	(9)	(11)

SOME EXTREMES.

Some of the extremes may also be interesting; and searching through the records of the Gas Light and Coke Company (which is of so large dimensions that it may be safe to assume as an average where differences in this way are concerned), we find that the lowest cost of "net coal" per 1000 c.ft. sold—viz., 2·84d.—was

* "Field's Analysis of the Accounts of the Principal Gas Undertakings in England, Scotland, and Ireland." Compiled by Herbert Edward Ibbs, Accountant to the Gas Light and Coke Company. Price 30s.

in 1911, and the highest—21·57d.—in 1874. Coke per ton realized 7s. 10·98d. in 1897, and 27s. 6·80d. in 1918. Tar per gallon 1·05d. in 1887, and 4·96d. in 1918. Liquor per butt 7s. 11·24d. in 1914, and 10s. 5·93d. in 1918. The capital employed was as high as 20s. 3d. per 1000 c.ft. in 1869, and fell to 10s. 8d. in 1917. The charge for capital was highest in 1873—viz., 17·85d. per 1000 c.ft. —whereas in 1918 it fell to 8·36d.

Reduced Use of Oil.

As instancing the change brought about by different methods of manufacture, the water gas made in 1907 by the Gas Light and Coke Company—viz., 4,952,399,000 c.ft—took 14,536,148 gallons of oil, whereas the make of 6,955,584,000 c.ft. in 1918 only required 5,750,032 gallons (equal to 2·94 gallons per 1000 c.ft.), as against 0·83 gallon per 1000 c.ft.

Price and Decrease of Consumption.

Regarding the 1918 edition, it will be observed that the price of gas has increased generally to a degree that possibly has not been approached in any other year. The effects of the war culminated last year; and it is to be hoped that the percentage of increase that is now shown over the previous year's figures will never again be experienced in any year. The sales of gas show a succession of decreases—testimony indeed to the effectiveness of the restriction imposed by the Government.

The Appendices.

The appendices to the work are as interesting as the detailed analysis that precedes. No end of interest can be found in the tables which give the details of coal carbonized, oil and spirit used, and gas made; and in those which show the number of ordinary and automatic consumers and stoves on hire, gas sold to private consumers, and the capital employed per 1000 c.ft. of gas supplied on the days of maximum delivery.

Excellent Work.

We congratulate the Editor (Mr. H. E. Ibbs) on his work, as well as all those who have been connected with its production. The whole of it, we understand, is undertaken by not more than six members of the staff of the Accountant's Department of the Gas Light and Coke Company, under the supervision of Mr. Ibbs. The work occupies a great deal of their own spare time from October until May, and is done with such thoroughness and care that the "Analysis" has become fully entitled to the description "Standard" which ever accompanies it. A few seasons spent on "Field" is calculated to give a man a first-rate education in gas accountancy. The price has had to be increased to 30s. during the war. But this is only in accordance with the general trend of things; and no one can complain that, even at this price, the full value is not given in accurate and reliable information.

NATIONAL GAS COUNCIL.

Central Executive Board Meeting.

A meeting of the Central Executive Board of the National Gas Council of Great Britain and Ireland was held last Tuesday.

Meetings at the Board of Trade and the Fuel Research Board on the report on Gas Standards were referred to.

The question of the continuation of the present calorific standard, in view of the coal shortage, was discussed; and it was announced that the Board of Trade would shortly be issuing a letter on this question.

The Chairman (Mr. D. Milne Watson) reported the steps which were being taken with regard to the financial hardships of gas undertakings. A deputation from the industry was to appear before Sir Auckland Geddes at the Board of Trade on Friday, July 4, at 3 o'clock, to discuss the provisions which were being sought under the Electricity Supply Bill and the financial position of the gas industry.

It was arranged that the Controller of Coal Mines should be asked to receive a deputation with regard to the coal position, especially as to removing the railway control in certain areas, and the necessity for the industry having preference to foreign shipments in supplies of coal.

The proposed continuation of rationing under the Household Fuel and Lighting Order was reported.

It was stated that steps were being taken to obtain an amendment to the Ministry of Ways and Communications Bill, clause 10, dealing with wagons, when the consideration stage of the Bill is reached.

The proceedings which were being taken in conjunction with the Federation of British Industries to obtain amendments to the Electricity Supply Bill were indicated; and it was stated that the Council had taken legal advice on clause 15 of the Bill, and had been informed that no restriction appeared to be imposed by the Bill on the powers of a District Electricity Board to supply gas, other than the necessity of obtaining the consent of the Electricity Commissioners. The Council were endeavouring to secure amendments to this clause accordingly.

A letter from the Home Office as to the Workmen's Compensation Act, and the desirability of establishing a system of insurance under the supervision of the State, was reported, and the draft reply of the Council approved.

A communication was read from the Department of Overseas Trade requesting the Council's assistance in getting together a Sub-Committee to appeal to the gas-producing and similar undertakings, with a view to raising a fund for establishing new degrees in commerce at the London University. This was referred to the London District Board for their consideration.

A Special Committee was appointed to consider the course which it would be desirable to take in view of the increased cost of meters, stoves, and fittings.

It was announced that Mr. D. Milne Watson had been appointed President of the National Benzol Association, and Mr. S. C. Henshaw and Mr. A. F. Pease Vice-Presidents. The Association now asked that the gas industry would nominate a Vice-President. It was resolved unanimously that Mr. J. H. Ellis (the Chairman of the Plymouth and Stonehouse Gas Light and Coke Company) be appointed.

The Council have been asked to appoint witnesses to appear before the Committee on Old-Age Pensions to-morrow (July 2); and arrangements are being made for evidence to be submitted on behalf of London and the Provinces.

Minutes of the District Executive Board for South Wales, dated April 3 and June 19, were read and discussed.

The Chairman announced that the Central Committee of Employers had unanimously resolved to alter the title of the Committee to the "Federation of Gas Employers." It was decided to agree to this alteration.

A resolution was passed protesting against the reports of the Coal Commission recommending the nationalization of the collieries. Communications on this matter are being sent to the Prime Minister, the Board of Trade, and the Local Government Board.

A general meeting of the Council will be held at the Caxton Hall, Westminster, on Tuesday, the 22nd inst., at 3 p.m.

NATIONAL PHYSICAL LABORATORY.

Annual Visit of Inspection.

The annual inspections of the National Physical Laboratory by the General Board have not been attended during the war period by the large numbers of interested visitors who were previously invited, and cumulative interest therefore attached to the annual inspection which took place last Tuesday afternoon, at which the scientific and technical worlds were fully represented.

Interest centred mainly in the experimental equipment and appliances which have been installed during the past four years to aid the country in the applications of physical science to the art of war. Large new buildings, fully equipped for special branches of research, now cover much of the open ground which lay between and around the laboratory buildings as they existed four years ago. Conspicuous among the new buildings is a spacious structure devoted to aerodynamics, in which there were on Tuesday last demonstrations in wind channels on model airships and aeroplanes. Similarly the William Froude National Tank, at one time used solely for researches on behalf of the naval architect, has latterly proved of service in making tests of seaplane floats.

There were naturally, in war research in physics, only a few points in which the gas engineer was more immediately concerned. That research stimulated by the operations of war covers hitherto unsuspected fields, was, however, obvious. For instance, the Food Production Department called for comparative tests of the thermal conductivity of cold storage insulating materials; and the ingeniously devised apparatus used therefor should, with some modification, become available for tests of high-temperature laggings, &c. Gauges and other metrological appliances have received much study; and optical instruments have been investigated in a much more comprehensive and exhaustive manner than in pre-war days. In the metallurgy department of the laboratory, some work has been done on a recuperative gas-furnace.

As a whole, the war has left the National Physical Laboratory equipped far better for its work than it would have been after twice as many years of peace. Physical research applied to technical requirements can now be pursued by the Director, Sir Richard T. Glazebrook, C.B., and his staff of expert assistants, on a scale, and with a completeness that were formerly out of the question.

BRITISH COMMERCIAL GAS ASSOCIATION.

Executive Committee's Report to the General Committee.

On Monday last week there was a meeting of the General Committee of the "B.C.G.A.," at which a report of the Executive Committee was presented.

It showed that two associate members had been elected since the date of the previous report, and twelve additional subscribers had been secured—several "as a direct result" of the District Conferences recently held. Arrangements are in hand for a further campaign based on a report of these meetings.

The payment by gas undertakings of subscriptions for the current financial year is well maintained; the amount received to

date being over £14,000. There is, it was stated, "every indication that the estimated income will be secured, and that it will be exceeded if a satisfactory contribution is forthcoming from the Society of British Gas Industries."

DISTRICT CONFERENCES.

After giving a list of the eight District Conferences recently held [as reported in the "JOURNAL"], the Committee say: Attention was focussed at these Conferences on: (1) The general work and policy of the Association—opportunity being taken to bring in the facts as to gas and electricity in relation to the conservation of coal, &c.; (2) the housing question; and, when time permitted, (3) the new scheme for sales organization, of which Mr. F. H. Holland has been appointed director. The meetings have been well supported by subscribing and non-subscribing undertakings, and a number of representatives of municipal and housing authorities, architects, &c., attended, and some took part in the discussions. The opinion was expressed by many members that these district meetings should be held more often and rather longer time be devoted to them. Undoubtedly, there is much to be gained from frequently bringing the work of the Association to the notice alike of subscribers and non-subscribers in different parts of the country, and giving the members of boards and committees, as well as the officers of the various undertakings, the opportunity of meeting and discussing matters of mutual interest. The amount of local press publicity secured has been very satisfactory; excellent reports having been published in all the important papers circulating in the districts in which the Conferences have been held, and especial prominence given to the facts relating to coal conservation and gas in relation to housing.

ANNUAL CONFERENCE AND GENERAL MEETING.

It was recommended that the annual conference and general meeting should be held at Birmingham on Tuesday and Wednesday, Oct. 28 and 29.

HOUSING.

The Association continues to give considerable service to the members and the public in connection with housing schemes throughout the country, and is being repeatedly consulted with regard to the question of gas equipment, &c. Watch is being kept on all schemes put before local authorities, and information communicated promptly to the gas undertakings concerned. Increasing use is being made, by subscribers and non-subscribers alike, of the Association's special housing memorandum. There is evidence of very practical interest in this question on the part of architects and municipal authorities; and large numbers of individual inquiries are constantly being attended to by the Association officials. The Association took space at the "Model Homes Exhibition" organized by the "Daily Express," and displayed there a model house fitted with miniature gas appliances which created great interest. The model house is being used by the Birmingham Corporation Gas Department at a housing exhibition to be held in the city early in July. Steps are being taken to give publicity to the figures put before the Edinburgh Conference by Major Wheeler, F.R.I.B.A. (architect to the Davis Gas Stove Company) and confirmed by Mr. Swain (architect to Messrs. Rowntrees) as to the saving in the cost of building that can be effected by the substitution of flues adequate for gas-fires for the usual chimneys necessary where coal fires are used.

CONGRESS OF THE ROYAL SANITARY INSTITUTE.

The thirtieth congress and exhibition of the Royal Sanitary Institute will be held at Newcastle-on-Tyne, July 28 to Aug. 2; and the Association has been invited to send delegates thereto. The Executive have accordingly asked Mrs. Cloudesley Brereton, Mr. T. P. Ridley, and Mr. Thomas Waddom (and they have consented) to act as the Association's delegates on this occasion.

COAL CONSERVATION.

Active steps have been taken to secure the circulation (either through the National Gas Council or by the individual gas undertakings) of reprints of Prof. Cobb's article in the "Edinburgh Review" and of Sir Dugald Clerk's paper to the Royal Society of Arts, to Members of Parliament, members and officials of local authorities, chambers of commerce, and other public bodies. A short summary of the main points of these two pronouncements, of Lord Moulton's speech from the chair at the Society of Arts, and of the Clerk-Smithells-Cobb report to the Institution of Gas Engineers, was prepared and is now available for circulation.

FUTURE PUBLICITY POLICY.

In view of the continued rationing of gas supplies, it is proposed to concentrate publicity work for the present—both direct and indirect—on the two subjects of coal conservation and housing, with a view to getting firmly into the minds of the public generally, and of the authorities, the idea that: "Gas is the Fuel of the Future."

FUEL RESEARCH BOARD.

The Association was represented by the Chairman of the Executive at a conference with the Board of Trade on the 16th inst. on the report of the Fuel Research Board. A further discussion on the questions at issue took place with Sir George Beilby and representatives of the consumers' interests on the 20th inst.; and another conference with these representatives has been arranged for an early date.

SALES ORGANIZATION DEPARTMENT.

The scheme that has been prepared by Mr. F. H. Holland (under the direction of the Chairman, and in consultation with members of his staff) for assisting members to organize sales development in their areas, has been put before several of the District Conferences, and has already as a consequence been adopted by a number of undertakings. The terms upon which the services of this new department are offered to undertakings will it is hoped make the department self-supporting, while giving subscribers full value for their money.

FOOD PRESERVATION CAMPAIGN.

It is proposed that the Association shall continue to work in co-operation with the Food Production Department on the question of food preservation. Much good propaganda work was done last year in securing the interest of gas managers and others in this subject; and while perhaps there is not the same keen interest displayed by the public this year, there is every reason to believe that, if good crops of some of the fruits are available this year, interest will be revived, and the question of preserving the surplus supplies taken up on practical lines. A circular letter has, therefore, been issued to all subscribing undertakings, seeking their co-operation in this matter. The department are willing to provide the services of qualified lecturers for the purpose of giving practical demonstrations, and to supply copies of Government leaflets free of charge.

FEDERATION OF BRITISH INDUSTRIES.

The Chairman of the Executive Committee has been elected a member of the Grand Council of the Federation of British Industries, as one of the representatives of the Public Utility Services Group.

ELECTRICITY SUPPLY MEMORANDA.

THE scheme adumbrated by the Government Electricity Bill has presented to the electric supply industry a plentiful crop of problems, most of them of an unwelcome character. Now that the details of a project that was welcomed within the industry itself some time ago are beginning to be examined, and the truth is revealed in more and more defined form, the visions of an easy and golden future grow more and more dim. The electricity industry showed too much speed; its greed for preferential conditions exceeded wise discretion. The exceptional conditions are not altogether so attractive as it was thought they would be; and they appear in the Government plans in excess of electrical demand. There are the purchase terms, for instance, on which generating plant and transmission lines are to pass from present ownership to the future national generators of electrical energy. This is a matter that has been referred to before. The terms of purchase are fair or unfair; they cannot well be both. If they are fair, there is nothing more to be said; if they are unfair, then proffered solace will not make up for hard cash.

Doubtful Solace.

The "Electrical Correspondent" of "The Times Engineering Supplement" cannot be a heavy investor in electricity supply companies. If he were, we doubt whether he would look with such satisfaction as compensating for lost capital value on the yet undeveloped benefits that it is prophesied will arise from the scheme. He finds there is precedent for the entire purchase of undertakings; but there is no precedent for the wholesale purchase of producing departments only—leaving the distributing and sales branches to the present owners. Both companies and municipalities are of opinion that the Bill proposes to treat them unfairly. But the "Electrical Correspondent" thinks to salve their grievances with paltry stuff such as this: "Both parties will be better situated from the business point of view when they are relieved from the work of generation, and are left to concentrate their efforts on the cultivation of their retail market." One would imagine that electrical undertakings had been existing in a grossly inefficient state, and that the cultivation of efficiency (so far as it is physically possible) at the generating end and of business at the selling end were two things that could not have existence together under a single management. We are told by the "Electrical Correspondent" that different talents are brought into play inside and outside the factory, and that those different talents every man does not possess. The main point, however, is that there will be large compensation under the new conditions; for there will be nothing for the officials to do but to sell electricity purchased wholesale at a lower price than the old cost of generation, which should mean a rapid extension of revenue. But supposing the officials have not the necessary talents for developing business? Supposing, too (this seems very probable), electricity is not delivered into the sellers' systems at a lower price. What guarantee has the "Electrical Correspondent" that a lower price will result under the new conditions? We cannot find any justification except the one fact of concentration; but this is only going to be obtained now at enormous capital expenditure, and capital is normally a weighty matter in the case of electricity. We see no ground for anticipating that the scheme taken as a whole will compensate shareholders for an inadequate price being paid

Talents and Time for Business Development.

for the generating plant and transmission lines; nor do we yet see that the conditions that will arise from the new scheme are such that it will cause the industry to pulsate with vigorous prosperity.

The Burden of Capital.

Attention has previously been directed in the "Memoranda" to what is very obvious, that the present, with its high cost for money and its heavy charges for material and labour, is a bad time for the great reorganization and reconstruction of the generating and transmission works of the electricity industry. Capital charges, as has before been pointed out, represented prior to the war something like 40 to 50 p.ct. of the total costs coming on an electricity undertaking of the first order; so it may be expected that, under the new conditions, the proportion will become more. The "Electrician" has editorially also called attention to this change in circumstances—referring to the matter as a serious burden, and admitting the uselessness of talking of cheaper power costs when capital expenditure is becoming unduly high. It is thought by our contemporary that, during the period of war, such inflated expenditure might be looked upon as a national matter, and relief might be expected from national funds. At any rate, it is submitted, it would not be unreasonable for the Government to afford relief to the undertakings chiefly affected. It is not the first time similar remarks have been made from electrical quarters. But the expectation that relief might be given from national funds has not been realized, and what the Bill before Parliament proposes is that money advanced to electricity from the public purse shall be refunded with interest. This is quite right and proper; for it is not within the legitimate province of the Government to extend preferential treatment to one industry over another, without some good cause, such as existed in the dye industry. Our contemporary, however, recognizes the uselessness of any such proposal now that the war is over. We fail to see the sagacity of the remark that "in one respect it may be said that this question is not so important as it otherwise would be, owing to the fact that part at least of electricity supply in this country is being nationalized." The capital charges will be on the higher scale, whether they are nationalized or not; and through the Electricity Commissioners and their offices and staff, and the District Boards and their offices and staffs, we can see the administration charges (which will also come on electricity) being of quite a new order. There appears to be a contradiction of the quoted remark in subsequent references to the capital costs of new generating and transmission plant; for it is submitted that new stations should not be laid down, in view of higher capital charges, more quickly than is obviously necessary for the needs of the industry. Extensions of existing plant are another matter. "Many of them are overdue; and industries which are dependent upon electricity must not be kept waiting, even if present capital costs are adverse to cheap power. We must look to the future to level-out these inequalities." The present position of things—governmental, financial, labour, coal, and structural—does not allow our hopes to be of a very sanguine character regarding the capacity of the future to level-out inequalities. Yet our nature has no great pessimism in its constitution.

Subtle Argument.

The "Electrical Review" tells its readers that, generally speaking, the price of electricity has only increased during the war by about 50 p.ct. The figures recently published by the "Electrical Times" show a very fair proportion of concerns that have advanced their charges between 50 and 100 p.ct. The price of gas, according to the "Review," has doubled. This is not correct even in the case (excepting one) of the London companies; and the nearer approach is made to the coalfields, the increases have been relatively modest to those down South. And where there has been ability through the modern systems of gas manufacture to increase production per ton by the steaming and water-gas processes, cases are to be found where a few pence addition to the pre-war price of gas per 1000 c.ft. sold have sufficed. A subtle argument follows the mention of the doubling of the price of gas. It is contended that, so far as pre-war installed plant and mains are concerned, the position of electricity supply undertakers has been relatively very much improved, although the actual price is higher than before the war. "There is, indeed," the argument runs, "no ground for reference to the high price of electricity nowadays. The value of money has fallen 50 p.ct. or so; and if we divide all prices and costs by two, we shall in effect restore pre-war values, when the fact will emerge that, in reality, compared with commodities if not with currency, electrical energy has decreased in price by 25 p.ct." Unfortunately consumers do not think much of the comparative values of currency. They have still an old-fashioned habit of comparing the total of their bills with those that preceded the war. There are hints by them at profiteering, and rude suggestions that, if it were not for the profiteers, a sovereign would go farther than it does. But if gas were generally double the price that obtained before the war, and electricity only 50 p.ct. more, the former would be cheap in comparison for all heating, domestic lighting, and (in cases where the load and hours of running were good) power purposes. If the temporary accession of power demand for war purposes so improved the load that in places the price was kept down lower than in less fortunate places, a change has come over the conditions; and some imposing industrial cities and towns have within the past six months enlarged their charges. The "Review" also claims that during the war the cooking load increased. A part of this was likewise only temporary. The demand for heating apparatus, it is alleged, also exceeded the supply. Reading the accounts of some company meetings in our contemporary not long since, complaint was seen of the large number of disconnections of heating apparatus that there had been; and we know, from other sources of information, that the published admissions were not the only ones that could have been made. Those concerns with apparatus returned to stock could not have had a demand exceeding the supply.

The Old Game.

It is a congenital failing of the electricians to compare the electrical new with the competitor's old. It was done years ago in the competition with the gas industry for lighting. Comparison was, long after the advent of the incandescent gas-burner, made with the flat-flame burner. The electricians are at the same game now in connection with the Government electricity generation reorganization scheme. Under the most favourable conditions to which the best equipped super-stations may hope to attain in industrial areas, it is hoped to generate power at an efficiency of 1·H.P.-hour per 1·5 lbs. of coal. In the House of Commons recently, the Home Secretary (Mr. Shortt) said about 2 lbs. These figures that are still in the air have been compared with the alleged average consumption of fuel for steam-engine purposes, which is so well known by electricians that it is put at anything between 5 and 8 lbs. per H.P.-hour—taking modern and antiquated engines together. There is no electrical station in existence in this country that can generate at 1·5 lbs. per H.P.-hour; and if it is ever done here, it will only be under very exceptional conditions. But there comes in the artifice—the comparison of the hoped-for new electrical efficiency with the bad ancient efficiency of the steam-engine, and the absolute ignoring of the gas-engine. Honesty claims that the hoped-for electrical efficiency should be compared with the best modern performances of steam and gas engines. A correspondent of "The Times Engineering Supplement"—Mr. R. S. Brailsford, of Messrs. Cole, Marchent, and Morley, of Bradford—states that there are in existence numerous factories that, with steam power, are using no more than 2 lbs. of coal per H.P.-hour, including the generation of steam for all their working and heating requirements, for meeting which they cannot dispense with the steam-boiler. In any average industry, the reciprocating steam-engine, exclusive of heating, should not use more than 1⅛ lbs. of coal per I.H.P.-hour. Allowing loss of efficiency of engines and rope and belt drives, this is increased to (say) 1·9 lbs. at the productive machine. Steam-engines can be purchased to-day from a dozen firms to give 1 H.P.-hour for a consumption of 10 lbs. of steam; and boilers have been recently tested under ordinary running conditions which give 83·4 p.ct. efficiency. In other words, with cheap coal of low calorific value, such a boiler evaporates 8·6 lbs. of water per pound of coal—making the coal consumption of the engine 1·26 lbs. per H.P.-hour, after allowing a liberal 10 p.ct. for losses between the boiler and engine. This shows the difference between comparing the electrical bird in the bush with the steam bird in the hand, which latter is not in its developed state of the 5 to 8 lbs. per H.P.-hour order.

A Truer Efficiency Comparison.

Mr. Brailsford does not mince matters in denouncing the deception of the electrical people in this matter of handing-out the results of incomparables for misinformation of the Government and the public; and he goes on to point out what takes place in the case of electricity. With electricity generated in the largest and most efficient stations, the figure of 1·62 lbs. of coal per B.H.P.-hour output from the generator can only be obtained where sufficient condensing water and coal of a high calorific value are available, and with the largest turbine units that are built. The losses between the generator and the productive machine are about 22 p.ct.; so that at the productive machine a figure is realized very near to that stated by Mr. Shortt—*i.e.*, approximately 2·1 lbs. of coal per B.H.P.-hour. This is assuming that the station is working at 100 p.ct. load factor. But actually very few stations work at more than 50 p.ct. load factor; and in such a case, the coal consumption per B.H.P.-hour at the productive machine would be considerably increased. In the case of an engine installed for a specific duty, the load factor when working both night and day should closely approach 100 p.ct. If therefore the comparison made by Mr. Brailsford be accepted on efficiency alone, the steam-engine drive is considerably more efficient than the electrical drive, as, in the case of the use of electricity, the factory would require extra coal in winter for heating purposes. Of course, in comparisons of steam-engines with gas-engines and electric-motors, from the manufacturer's standpoint fuel and efficiency are not the only considerations. There are the questions of capital expenditure and maintenance, labour, and additional supervision in connection with steam production. It is, however, absurd for electrical men to attempt to underestimate the efficiencies of their competitors; for underestimations of the kind have a way of producing an uncomfortable reflex action. But what Mr. Brailsford says on behalf of the steam-engine in relation to fuel expenditure shows that the fissures in the foundation upon which the Government is building are increasing in number and widening with every day that passes.

MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

WORKS VISIT AND MEETING AT OSSETT.

A gathering of the members of the Institution took place on Wednesday morning and afternoon last, at Ossett, under the presidency of Mr. ARNOLD E. MOTTRAM. About 130 members were present.

The visitors were met at the railway stations and conveyed by motor-car and char-a-banc to the Ossett Corporation Gas-Works, of which Mr. Mottram is Engineer and Manager. The party were conducted over the works by the President himself, who explained the various features which were seen, and which have already been described in detail in the "JOURNAL," with further remarks thereon in the course of Mr. Mottram's recent Presidential Address.* Chief interest centred in the tar dehydration plant and in the vertical-retort house, where the plant of 72 retorts, in sets of three, is by Messrs. Goodall, Clayton, and Co., of Leeds. It was noted, in passing the old house of disused hand-charged horizontal retorts, that the condensers attached to that house are linked-up with the new retort-house some distance away, and in use. The party witnessed the discharging and charging of two sets of retorts.

At present, during summer, only these two sets are in use; but it was pointed out that whereas, with the old hand-charged horizontal plant, a staff of 24 stokers was required, the whole of the present plant of 72 retorts, when in full winter use, can be charged and discharged by the four stokers who work the reduced number during the summer. The four men work in eight-hour shifts of two per shift, one at the top and the other at the bottom. It was observed that the Ossett undertaking is no better placed than the average works in the matter of quality of coal. That being charged was very small stuff, causing a good deal of dust in the process of charging, and blazing-up considerably, though, from the men's point of view, it has the advantage of avoiding the necessity of pricking-down. The whole set of three is discharged together, and the coke is run immediately into a cooling trough.

After the visit, the party were conveyed by the cars to the Ossett Town Hall, where, as the guests of the Gas Committee, they were served with luncheon. The Chairman of the Gas Committee (Alderman H. Robinson, J.P.) presided, and was supported by the Mayor of Ossett (Alderman G. F. Wilson) and the President.

After the honouring of the Loyal Toast,

Mr. SAMUEL GLOVER proposed "The Ossett Gas Committee," which, he remarked, involved the toast of the Corporation as a whole, because the Council itself comprised the Gas Committee. He said the Institution had had the pleasure of having the Mayor of Ossett with them on former occasions, and hoped they would meet him many times again. The Ossett Corporation were enterprising; and the Institution had had proof that day that they conducted their business with foresight and consideration of the fact that they had great responsibility in being owners of a good gas undertaking. Since they took over the works from a company about eighteen years ago, the capital account had not become much greater than it had been at that time, despite the many improvements which had been made; and this was owing to good management. He believed the Committee were not only enterprising in the purchasing of plant for their works, but that they tried to be consistent in rewarding those who worked for them. This was a matter which was very near to the hearts of most of those present that day. As he could not be accused of having any personal "axe to grind" in the matter, he could say that there were those among them who had experience of corporations who did not do what the Ossett Corporation did for their officials and workers. It was necessary that officials should have consideration as well as manual workers. The Institution were doing quite right in putting forward their claims for consideration; and he hoped they would continue to do so until those people who had not been consistent in the matter learned to be brave enough to be so, and not to be led off by people who took sides and kept others from doing their duty consistently. The Ossett Corporation had fully maintained the reputation of Yorkshire in the matter of hospitality in the luncheon they had provided.

Alderman ROBINSON, in reply, said his Committee had readily and unanimously agreed to offer the Institution hospitality on the occasion of the visit. He would only be saying what the whole Committee would say, if they were present, in offering a hearty welcome. It would certainly be gratifying to the Committee if they learned that the visit had been a satisfaction to the members of the Institution, and had contributed in any way to the usefulness of the industry. The visitors had been shown all that there was to be seen. The Committee had tried, with what they had, to keep pace with modern developments and to meet the public demand. They had taken over the works at a time when they were practically out of date and wasteful and expensive to operate. They had been making 9270 c.ft. of gas per ton of coal, and had a leakage of 16 p.ct., but to-day they were selling 13,500 c.ft., and had made on the average 14,816 c.ft. per ton. They had also reduced the leakage by one-half, and doubled the consumption. They had been a spending committee, and had not yet really had a fair chance to show any great profits and cheap gas as the result of their labours, though at the beginning of the war he should say their gas, at 2s. 6d. per 1000 c.ft., and 25 p.ct. discount for heating, power, and cooking, compared well with most undertakings. After spending enormous sums of money on improvements, they had accumulated a reserve fund of £5000, though he was sorry to say the war conditions had eaten somewhat into this. When the country became more settled, and they could again "feel their feet," they would once more justify their existence and their expenditure. Notwithstanding competition, they would be able to hold their own and do good service for the community. Proceeding to propose the toast of the "Manchester District Institution," coupled with the name of the President, he said that in electing Mr. Mottram the Institution had certainly honoured him, but it had also rendered itself a signal service. As a profession, the gas industry had been passing through stirring times. They had been taxed and tested in ways which had revealed unexpected strength, resourcefulness, and power. They had come through the ordeal of the war with great credit, and had played a part in the winning of it without which there would have been created circumstances almost too dreadful to contemplate. Politicians might quibble and disagree; but the credit remained to the industry of producing the material which at one time meant the winning or losing of the war. He had, from his observations, come to the conclusion that the industry had not yet passed all its storms and troubles. They were, indeed, just approaching a situation which, he thought, would determine the future both of the profession itself and of the industry as a whole. Hitherto they had had very little real competition; but this was now threatening, and they must be wise enough, and alert enough, to see that the other side did not get any advantage beyond what they were legally and honestly entitled to. In fair fight, by enterprise and enthusiasm, he thought that the gas industry would win. Their scientific knowledge must emerge in simplicity as well as economy of production; and, on the other hand, their business and commercial instincts must be cultivated in order to capture the market. They must produce good cheap gas, and sympathetically enter into the circumstances of those who were compelled to use what they were making. In most undertakings the combination of science and business was essential; and one of the greatest things their industry could do was to make its members efficient in both these branches. They could not afford to overlook the technical and scientific side, nor could they hope to succeed if they ignored the commercial side; and he was sorry to have to admit that hitherto they had not sufficiently cultivated the commercial side of their men.

The PRESIDENT, in responding, said the Institution had been formed 49 years ago, and would be reaching its jubilee next year. The industry had started in a very small way, but had grown by leaps and bounds; and to-day it was absolutely essential to the life of the State, as had often been proved in the course of the war. One would think, to judge from the puffed-up statements in the daily Press nowadays, that the only thing on earth was cheap electricity. To his mind, this was ridiculous, because there was no such thing as cheap electricity; and one of their objects as an Institution was to save the State from riding to meet the Millennium on a "white elephant."

THE BUSINESS MEETING.

At the ordinary business meeting, which followed the luncheon, and was held in the Town Hall, the PRESIDENT occupied the chair.

Before proceeding with the business, Mr. Mottram referred in terms of deep regret to the loss the Institution had suffered by the death of two old and highly respected members—Mr. J. R. Frith, of Runcorn, the father of their Hon. Secretary (Mr. G. S. Frith), and Mr. J. E. Lamb, of Altrincham. Mr. Frith had been a member for 44 years, and had taken a very active part in the proceedings until failing health, at a ripe age, had a few years ago prevented him from doing so. Mr. Lamb was a member of 30 years' standing, and a very regular attendant at the meetings. He was a man who, though of quiet disposition, took a great interest in the progress of the Institution and of the Industry.

Resolutions of condolence with the relatives were passed.

THE FUEL RESEARCH BOARD REPORT.

Mr. JOHN BOND (Southport) then opened a discussion on the "Fuel Research Board's Report, and its Effects on Manufacturing Methods"—see below.

On the proposition of the HON. SECRETARY (Mr. Frith), seconded by the PRESIDENT, a vote of thanks was awarded Mr. Bond for opening the discussion.

Before dispersal the visitors had tea in the Town Hall as guests of the Ossett Gas Committee.

* See "JOURNAL," Vol. CXXVIII., p. 596, and Vol. CXLV., p. 458.

THE FUEL RESEARCH BOARD'S REPORT AND ITS EFFECT ON MANUFACTURING METHODS.

By JOHN BOND, of Southport.

I have been asked by the President of the Manchester District Institution of Gas Engineers to start a discussion on a subject which is of vital importance to the gas industry, and one which opens-up many points requiring consideration by gas engineers and managers responsible for the welfare of the gas industry. The subject for discussion is "The Fuel Research Board's Report and its Effect on Manufacturing Methods."

The Fuel Research Board were asked by the Board of Trade and other Departments concerned to advise as to "What is the most suitable composition and quality of gas and the minimum pressure at which it should be generally supplied, having regard to the desirability of economy in the use of coal, the adequate

recovery of bye-products, and the purposes for which gas is now used." The report of the Fuel Research Board has been published in the Technical Press, and no doubt has been duly considered by everyone present. But members of the Institution may not yet have had an opportunity of determining for themselves the effect which the alterations in the standards may have when applied to their respective undertakings. I would first like to assure you of the good intentions of the members of the Fuel Research Board in their endeavour to arrive at such standards and conditions as will ensure gas undertakings having much greater freedom in manufacture and distribution than that which they have had in the past. I am convinced that Sir George Beilby and his colleagues have been working in what they consider to be the best interests of the producers and consumers of gas.

The members of the Fuel Research Board recognize that the gas industry is the most important existing organization for the distribution of potential heat-energy. This statement has the support of Sir Dugald Clerk and Profs. Smithells and Cobb, and is backed by the whole of the gas industry. The Board, as well as the engineers representing the gas industry, are most anxious to obtain from the 18 to 20 million tons of coal which is annually carbonized in gas undertakings the greatest amount of heat units in a gaseous form, and also residual products, at the cheapest possible rates. It is only by relieving gas undertakings of those Parliamentary Acts which have been imposed upon them from time to time—and which I may suggest have penalized the producer and the consumer—that undertakings will be able to forge ahead in directions beneficial to all concerned. It is necessary that the gas industry should be able to adopt new methods of manufacture and distribution without being saddled in any way by unjust restrictions such as those which have been imposed on the industry in the past; and it is clearly the duty of all concerned in the prosperity of the gas industry to look well into the future with regard to new standards and regulations which are now having the consideration of the Board of Trade.

The report states that it would be idle to pretend that consumers generally are satisfied with the results of the alterations in standards which had begun to come into operation before the war; and the advent of war conditions tended to aggravate this dissatisfaction. I do not know of any case where gas consumers were dissatisfied with the alteration from an illuminating power to a calorific power standard, or from a high to a lower calorific power standard; but in my own particular works, sufficient time was not allowed to give these alterations of the standards a just trial before the advent of the war. I have no doubt that war conditions did cause the consumers of gas to be dissatisfied with their gas supply. Gas engineers and managers who have always been anxious to give every consideration to their consumers of gas were placed by war conditions in a somewhat difficult position, and were, through no fault of their own, unable to give the consumer the attention similar to that which he had in pre-war days. Not that the gas engineer wished to serve the consumer less, but that he wished to serve the nation more, especially with regard to producing those products which were necessary in the conduct of the war.

War Time Demands on the Industry.

Let me briefly outline the position of the gas industry as regards the part it played in securing products for Government requirements. In the first place, there was a shortage of T.N.T; Gas undertakings were asked to secure toluene in large quantities. and the majority of them throughout the United Kingdom set to work to endeavour to procure for the Ministry of Munitions the amount they required. Shortly after this, there was a great demand for benzol; and gas undertakings turned their attention to extracting from the gas both toluene and benzol at a time when their coal supplies were governed not by the Ministry of Munitions, but by the Coal Control Department of the Government. At a later stage of the war, the Government were anxious to secure fuel oil for the navy. This product could best be obtained from vertical retort settings by a slight adjustment of temperature and by steaming charges during the carbonization of the coal. For obtaining extra quantities of fuel oil this can be more readily accomplished in the vertical retort system than by horizontal retort carbonization. So that on the one hand gas undertakings can supply from horizontal retorts a maximum amount of benzonoid hydrocarbons, and from the verticals (by the aid of the steaming process) the maximum amount of fuel oil, chiefly of the paraffin series of hydrocarbons.

Working with Inferior Coal.

A number of gas undertakings had to be content with supplies of coal of inferior quality, some of which contained no less than 30 to 35 p.ct. of ash; and the coke from this coal was so poor that it was difficult to maintain the temperature of the horizontal retorts for the production of the maximum amount of hydrocarbons of the benzene series. Gas engineers endeavoured to produce large quantities of these products along with a reasonable make of gas per ton of coal. To achieve this object, they had to resort to overpulling at the exhauster, as it is a well-known fact that a few tenths extra pull increases the temperature of the setting. This method of manufacturing gas had to be resorted to not because of its cheapness, but because supplies of both gas and products were essential. Excessive pulling enabled gas undertakings to secure a great yield of gas per ton of coal carbonized, but at the same time the gas produced contained a larger quantity of inert gases in the form of CO_2, nitrogen, and oxygen. Overpulling at the exhauster causes the ascension pipes to stop-up more readily, and the hydraulic mains become blocked by thick tar. I have experienced through overpulling excessive amounts of naphthalene and a greater corrosion of the services through the excessive oxygen content. Shortly after stripping had been in operation, a large number of complaints were recorded, due to the deposition of naphthalene and corroded services. I have no doubt that the corrosion of services was aggravated through gas engineers employing a portion of their washing plant for the extraction of toluene and benzol by either tar washing or washing with heavy oil. In these cases, the gas was not entirely stripped of ammonia; and the stripping of gas of the benzonoid hydrocarbons may have also been the cause of the more rapid oxidization of the wrought-iron services. All these questions have received, or are receiving, the attention of the Life of Gas-Meters Committee; and I have no doubt that deposits and corrosion of services will be in great measure prevented in the future. It can be readily realized that, under the aforementioned difficulties, gas undertakings had to conduct their business in such a manner that it was impossible to satisfy the consumers generally. So far as I have been able to ascertain, the greater part of the complaints arose through a shortage of supply occasioned by stoppages in the gas services of the consumers.

To Obviate Overpulling.

Taking into consideration the ill-effects of overpulling at the exhauster, I am strongly of opinion that this practice should not be entertained when studying the best interests of the gas undertaking, as the additional cost incurred greatly outweighs any increase in the make of gas. I have been connected with many inquiries and experimental work in connection with vertical retorts; and I have always found that to keep a level gauge at the outlet of the retorts is the best means of securing the highest results from any particular class of coal. To obviate the necessity of overpulling, I maintain that it would be an advantage to the producers and the consumers if the Coal Control Department would insist upon coal being sent to gas undertakings which is in every way suitable for gas-making purposes.

The Question of Stripping.

The report refers to the gas undertakings being alive to the methods of stripping from the gas hydrocarbons of the benzene series. This, during the period of war, was of vital importance to the nation; but it is of less importance when these products are used for motor spirit or for the synthetic chemical industry. I have for the time being had to abandon the stripping process on account of the poor quality of coal supplied to my works; but as soon as I become a free agent to buy coal best suited to my requirements, I would again consider the question of stripping.

Charging on the Heat-Unit Bases.

The Board state that they believe the interests of the consumers can be best conserved if their contract with the gas undertaking is based on the sale and purchase of heat energy measured in fixed units which can be scientifically determined by simple means. They therefore propose that the consumer shall be charged for the thermal units which he actually receives in the same way as the electrical consumer is charged for the Board of Trade units which pass through his meter. I agree with this recommendation; but I am of the opinion it is the Board's intention that the calorific value declared by the producers is to be the minimum. Therefore, if the producer supplies to the consumer gas containing a greater number of B.Th.U. than that declared, the extra B.Th.U. supplied shall not be paid for. On the other hand, if the producer supplies a gas of lower calorific value than that declared, the producer would be liable to a penalty.

It may be pointed out that there are two methods of charging for gas on the thermal unit basis:

1.—By charging at a fixed rate per 1000 c.ft. of gas of a declared calorific value.
2.—By calculating the thermal units which have passed through the meter and charging: (*a*) Either upon what may be termed a large unit of gas; or (*b*) on what may be termed a small unit of gas.

You have already had the question of the charging on a heat unit basis placed before you by Dr. Carpenter and others. I suggest that the gas industry should establish a heat unit for gas similar to the Board of Trade electrical unit—that is to say, a gas unit equivalent to 3420 B.Th.U. Gas undertakings could then supply as many gas units for a penny as the gas estate could afford. I may remind you that there remains for consideration the question of the sliding-scale charges, the maximum prices at which gas may be sold, and the practice of municipal gas undertakings handing money over in relief of rates. These questions will arise in connection with the alteration of standards.

The Question of Inerts.

The Board state "that, with regard to the dilution of coal gas by inert gases, many leading gas engineers have expressed their strong disapproval of the practice; and we are not aware that any engineer of standing would be prepared to defend it seriously." I have already expressed my views with regard to inerts which find their way into the gas by overpulling. I could not seriously defend this practice, on account of the many disadvantages which it brings in its trail; but if a gas undertaking declares that it will sell gas of a calorific value of 400 B.Th.U. on the heat unit basis,

I do not see that the consumer will suffer or have to pay for inerts if the undertaking strictly adheres to its obligation. Gas engineers may not be in a position to steam the charges of their horizontal or vertical retorts and use what the Board term a natural diluent for the coal gas. At the same time, an engineer may be desirous of reducing his calorific value from (say) 550 to 400, so as to benefit the consumer—it having been conclusively proved by scientific investigation that greater efficiency of the illuminating power of the incandescent burner is obtained by lower-grade gases containing a high percentage of inerts. It would be an unwise procedure to saddle gas undertakings with a restriction which may at some future period interfere with any process likely to reduce the cost of producing gas. Taking all these points into due consideration, and having regard to the fact that the gas industry is more or less in the hands of the Coal Controller, I should advise that gas undertakings should be free from inert restrictions.

PRESSURE, SULPHUR RESTRICTIONS, AND CALORIFIC VALUE.

It is suggested that the pressure of gas should be not less than 2 in. of water when taken at the exit of the consumer's meter. I do not consider this to be a fair clause, as in a great number of cases consumers own their own meters and services. A consumer may have purchased many gas appliances which, if used at the same time, would consume gas altogether out of proportion to the capacity of the meter, or a consumer may have a service too small for the meter installed. Consequently, in such cases, pressures would be greatly reduced, and possibly at the time when the inspector was making a test. I am strongly of the opinion that the only fair place at which pressures should be taken is on the producer's mains. The pressure could be readily ascertained at any gas-lamp standard fitted with an attachment on which a pressure gauge could be fixed.

It must be pointed out, with regard to sulphur purification, that the Board have received strong recommendations as to the desirability of completely removing sulphur compounds from the gas. In the first place, I do not know of any method by which the whole of the sulphur compounds can be removed from coal gas; and I am of opinion that it would inflict upon producer and consumer alike a financial burden if a portion of the sulphur compounds other than sulphuretted hydrogen be removed.

The calorific value of a gas supplied by an undertaking would have to be determined from time to time by a calorimeter; and it is suggested in the report that every supplied district above a certain magnitude should have one or more gas examiners.

THE CONSUMERS' INTEREST.

The Board also advises that inspectors should be appointed to devote the whole of their time to looking after the interests of gas consumers. If inspectors be appointed by any authority other than that of the gas undertaking, I feel confident that it would not be in the interests of either producer or consumer, and would only lead to much friction. I suggest that inspectors should be appointed by gas undertakings, and be engaged on some system for the maintenance of consumers' gas appliances. It is of paramount importance that all apparatus used in connection with the consumption of gas should be certified or approved by the gas undertaking or purchased by the undertaking for the consumers' use. A great waste of gas takes place owing to burners, mantles, and cooking utensils being unsuitable for their particular requirements. I would press for a maintenance scheme on the grounds that consumers of gas leave the greater portion of their apparatus in charge of a domestic servant. Proper attention is not given to cleanliness. Burners are not regulated to the best advantage; and although gas engineers may endeavour to educate the public with regard to this matter, they invariably find that their instructions are not carried out. The consumers require light, heat, and power with as little trouble to themselves as possible; and I believe that they would very gladly contribute to a maintenance scheme rather than be put to any inconvenience. No doubt a maintenance scheme would be the means of a better co-operation between the producer and the consumer, and would be less costly than the engagement of inspectors who were not under the control of the gas undertakings.

CHANGE OF STANDARDS.

It is difficult to predict what effect a change of gas standards will have on the gas industry as a whole. I have no doubt that greater freedom to develop the methods of manufacturing and supplying gas best suited for the requirements of the public will ultimately enable gas undertakings to produce and supply gas at a cheaper rate. But if restrictions are imposed which prevent further developments of modern schemes, then I believe that the advantages on the one hand would be neutralized by the restrictions on the other. It will be necessary for every gas engineer to work-out the cost of making gas of a reduced calorific value for the works on which he is engaged. These costs will vary in each undertaking, and will greatly depend on the class of plant the engineer has at his command. There is no doubt that a much greater make of gas per ton of coal can be secured by the process of manufacturing water gas within the retort or in separate apparatus; but it is desirable that every undertaking should prepare a heat as well as a commercial balance sheet for his gas estate.

I have purposely condensed my remarks as far as possible, so as to give a greater amount of time for the discussion on the various points raised, with the object of obtaining the views of engineers responsible for gas undertakings in this district, as I feel confident that your views will be appreciated and considered by the Fuel Research Board.

DISCUSSION.

The HON. SECRETARY (Mr. Frith) read the following communication received from Mr. TIM. DUXBURY (Oldham):

THE FIELD FOR LOW CALORIFIC POWER GAS.

I consider the report in general to be highly satisfactory, both to the producer and consumer (with one or two exceptions), and is a complete revolution in the history of town gas manufacture and supply. I have argued for two or three years past that, unless there is a complete revolution in the methods of manufacture and supply, the gas of 500 or 600 B.Th.U., or pre-war gas, will have to take a back-seat, as it will be superseded by electricity, Mond gas, suction gas, or some kind of producer gas or blue water gas, which will be made on the premises of industrial works. There must be thousands of such gas-making plants already in existence in this country. We need go no farther than the National Gas-Engine Company, at Ashton-under-Lyne, where the whole of their work is satisfactorily done, and the electricity generated by means of a 5,000,000 c.ft. per day suction gas plant. I have had several interviews with this go-a-head firm, and they assure me that they have no desire to erect suction-gas plants throughout the country, but that they have been driven to it by the demand for such gas, and by the indifference—or shall I say negligence—of gas companies and corporations in meeting the demand. The quality of this gas is only 120/130 B.Th.U.; and we have fixed gas-fires and incandescent gas-burners at their works which give quite satisfactory results. The directors are simply amazed that gas undertakings have not tackled this problem years ago, and so prepared themselves to supply such a gas, especially for heating, cooking, and industrial purposes. I have often seen gas from another plant of 150 B.Th.U. net, at ordinary town pressure of about 30-10ths, give satisfactory results in a gas-fire and an incandescent mantle. There are probably hundreds of millions of cubic feet of such quality gas doing its work entirely satisfactorily and economically in this country. Then surely a town supply of 400 B.Th.U., or even lower, can be made to do its work quite satisfactorily. And what would this mean to the country in the conservation of coal? About 20,000,000 tons of coal are used annually by gas undertakings. I am of opinion that 30,000 c.ft. of gas per ton can be obtained of about 400 B.Th.U., giving 12,000,000 B.Th.U. from a ton of coal, as against (say) 10,000 c.ft. of 600 B.Th.U., or 6,000,000 B.Th.U., pre-war. This would mean a saving of 50 p.ct. or 10,000,000 tons of coal per annum, or 100,000,000 tons in ten years. We in Oldham can obtain 10,000,000 B.Th.U. in vertical retorts, and supply a gas of over 400 B.Th.U. gross; and although probably half our gas was made in horizontal retorts without steaming, we have saved over 20,000 tons of coal this year, and made the same amount of gas of 458 B.Th.U. gross, as against 517 B.Th.U. the previous year. We are looking forward in the near future to obtaining over 20,000,000 B.Th.U. from a ton of coal, of 150/200 B.Th.U. gas.

WHY FIX A STANDARD?

I am pleased to see the Fuel Research Board, generally speaking, favour the abolition of all standards, as regards B.Th.U.; and I am thoroughly convinced that this is the proper course to adopt. The report contains such clauses as the following:

> For the producers, it is important that they should be as free as possible to develop those methods of production which will yield the largest and most economical output of potential heat energy in the form of gas from the coal they use. The national interests will best be served by that policy which will promote the widest adoption of scientific methods for the preparation and use of fuel.

The report again says:

> We have followed with close attention the views and opinions on gas standards which may have found expression in the technical Press and elsewhere during the past years. . . . The prevailing view appears to be that the elasticity in manufacture which they (the technical leaders) desire, can best be secured by the fixing of a sufficiently low calorific standard.

But why fix a standard at all, as nobody knows what new methods may be discovered if inventors have a free hand with no standard fixed. Gas undertakings are not likely to be so blind as to supply a gas unsuitable for its consumers, and so lose its customers. It is to the best interests of the undertaking to satisfy its consumers; and this can be done by fixing no standard, and allowing each undertaking to make its own arrangements with its own customers, especially if the consumer only pays for the B.Th.U. obtained. I contend that a low-grade gas can be manufactured and supplied so much cheaper that the consumer will in the end be the gainer, and the gas undertaking will increase its business.

The report again says:

> From evidence supplied to us, we are satisfied that the effects of the unsatisfactory nature of the gas supply during the war have been greatly aggravated by the fact that the burners and other appliances in which it had to be burned were wholly unsuited for its safe and efficient consumption.

This we have repeatedly proved in Oldham. When we reduced from 600 to 550 B.Th.U., we had complaints; but as soon as the appliances of those who complained were adjusted to this quality, the complaints ceased, until there was a further reduction to 500, 450, and to its present quality of about 400 B.Th.U. Each reduction brought in complaints; but when the appliances were adjusted, the complaints ceased. I believe this could go on down to 350 or even 300 B.Th.U.

There is no reason why every fire-grate should not have a gas-fire fixed, all food cooked by gas, all water heated by gas, and all furnaces and mill boilers fired by gas. Then what about the atmospheric conditions? A manufacturing town like Oldham, with its 50,000 houses

and its 500 mills and workshops, will be fit to live in, and a vast sum of money will be saved annually in cleaning, beautifying, clothing, &c.

The report says:

> The need for a greatly increased output of metallurgical coke, and the consequent development of carbonization in recovery ovens, is likely to bring into prominence the absorption of the resulting gas into the distributing systems of gas undertakings.

This, again, is an argument in favour of low grade gas.

The coke obtained from the Oldham vertical retorts, with a small throughput, high temperature in the carbonization zone, and steaming approaches coke-oven coke. It has been tried for foundry work; and the report was quite satisfactory. This coke contains about 0·5 p.ct. of moisture, and 2 to 3 p.ct. of volatile matter.

INERTS.

Dealing with the question of inerts, I do not agree with the report. The report proceeds:

> With regard to the dilution of coal gas by inert gases, many leading gas engineers have expressed their disapproval of the practice, and we are not aware that any engineer of standing would be prepared to defend it seriously.

Who are these "leading gas engineers?" Have they satisfied themselves by making practical tests with gas containing (say) 40 p.ct. of air inerts on a suitable boiling burner, as against a gas containing (say) 12 p.ct. inerts as made by a mixture of blue water gas? At the recent Institution meetings in London I gave results of Oldham tests with gas containing 38 p.ct. of air inerts (not by over-exhausting, but by introducing air into the gas as made in horizontal retorts without steaming), as against a mixture of blue water gas containing 14 p.ct. of inerts.

1 Quart of Water Raised to Boiling Point.

	14 p.ct. Inerts.		38 p.ct. Inerts.
Gas used, c.ft.	1·522	..	1·456
Calorific value of gas net	384	..	368
B.Th.U. required	584	..	536
Average efficiency, p.ct.	64·14	..	70·76

These tests showed that, with a suitable burner, the 38 p.ct. inert gas boiled a quart of water with less gas than did the 14 p.ct. inert gas. Then, again, the gas containing 2½ times more air inerts gave a much better light on a flat-flame burner than did the 14 p.ct. inert gas, and the incandescent gas-mantles in the street lamps have never been better than with the "inert low-grade gas." Prof. Cobb, at the recent Institution meetings in London, stated that:

> If a straight coal gas of (say) 525 B.Th.U. gross per c.ft. is diluted with an inert constituent, nitrogen, until the calorific value is reduced by stages to 450 B.Th.U. gross, the mixtures so obtained show no differences of any practical importance as regards either attainable candle power or thermal efficiency, provided that the heat units are delivered at the same rate.

This is exactly what was done in Oldham by introducing air. The 38 p.ct. inert gas contained 31·4 p.ct. of nitrogen, as against 7·7 p.ct. nitrogen in the 14 p.ct. inert gas.

In face of the above results, also of Prof. Cobb's statement, why should 12 p.ct. inerts be fixed as a maximum—indeed, why fix a standard at all for inerts, as the gas undertakings will see to it that they supply the most suitable and economical gas to the consumer. It has been stated more than once that one B.Th.U. was as good as another, but it depended upon the company it kept. My experience is that in low-grade gas one B.Th.U. did more work with existing appliances, and that the company it kept—viz., inerts—improved its duty. We have recently made some tests of the composition of suction gas as made in a plant working in Oldham.

	Per Cent.
Carbon dioxide	8·42
Unsaturated hydrocarbons	0·00
Oxygen	0·00
Carbon monoxide	20·98
Hydrogen	14·55
Nitrogen (by difference)	56·05
	100·00

This gas contains 64·47 p.ct. inerts and only 125 B.Th.U., and does its work splendidly on a large gas-engine. This is the gas we shall have to compete against in the future. Then why harass and handicap gas undertakings with standards of any kind?

Composition of Vertical Producer Gas.

	Per Cent.
Carbon dioxide	10·79
Illuminants	0·14
Oxygen	0·26
Carbon monoxide	23·32
Methane	0·28
Hydrogen	8·60
Nitrogen	56·59
Calorific value	117 B.Th.U.
	Per Cent.
Inerts—	
CO	10·79
O	0·26
N	56·59
	67·64

Unless we supply a good cheap low-grade heating gas, our industry is likely to suffer.

Composition of Mond Gas (Tookey).

	P.Ct.
Hydrogen	27·5
Methane	2·0
Unsaturated hydrocarbons	0·0
Carbon monoxide	11·0
Nitrogen	43·0
Carbondioxide	16·5
Oxygen	0·0
Sulphuretted hydrogen	0·0
	100·0
Total inerts	59·5
Calorific value	148 B.Th.U. gross.

I do not agree with the paragraph in the report which states: "And from the opinion of experts, we are satisfied the imposition of a maximum limit of 12 p.ct. of inert gases would in no way curtail the legitimate freedom of choice of raw materials and methods of production by producers," &c. In my opinion, it will seriously impede progress in methods of gas manufacture, as there is no finality of methods for producing heating and industrial gas.

DUAL SUPPLY SYSTEM.

I am pleased to see that the Board recognize the possibilities of a dual supply system of mains for low-grade industrial gas when they say that "The more general adoption of a dual supply system may not be so far off as many of us have supposed." In Oldham, we have had this matter under consideration for twelve months, and in my paper before the Institution last October I stated that it was our intention at some time to lay "trade gas-mains," just as we have already trade water-mains to the most thickly populated industrial districts of the town. By this dual system we should probably supply a gas of 150 to 200 B.Th.U. for boiler firing and industrial purposes, at probably 6d. or 9d. per 1000 c.ft., if the Board of Trade will only give gas undertakings a free hand and no restrictions as to calorific value or inerts.

GASES AVAILABLE.

The report suggests a very wide margin, varying from 800 down to 130 B.Th.U.; and if this variation is allowed by the Board of Trade, then there will be ample scope for invention. The report proceeds:

> The sheet anchor of the gas industry in future must necessarily be its possession of the cheapest known means of distributing potential heat energy in a convenient form. For lighting and for power production, the electric supply of the future may seriously contest the field with the producers of gas; but for the supply of heat, gaseous fuel ought to remain supreme, if its production and use are developed on sound lines.

I entirely agree with this clause, and in my opinion the "development on sound lines" of low-grade gas, was by way of low-grade gas, of good composition, without any restrictions as to calorific value or inerts.

SULPHUR IN GAS.

The report suggests the complete removal of sulphur from the gas. We have been making some experiments on the amount of sulphur by our present method of gas-making on vertical retorts, with the following results:

From November, 1915, to April, 1916, the H_2S in the crude gas at the purifier inlet averaged 840 grains per 100 c.ft. of gas. April, 1916, to March, 1917, average 653 grains. March, 1917, to April, 1918, average 585 grains. April, 1918, to June, 1919, average 458 grains.

In the same way, the average sulphur contained in the gas as supplied to the town has been as follows:

From horizontal retorts, 43 grains of sulphur per 100 c.ft. of gas. From vertical retorts, 28 grains.

Similar coals have been used throughout these experiments.

Mr. JOHN WEST (Manchester) said Mr. Bond had touched on every important point. He (Mr. West) had taken considerable interest in the Fuel Research Board's report, and had studied it carefully. He was rather surprised to find it so favourable to the gas industry. He agreed with Mr. Bond that they must not look upon the members of the Board as opponents. [Hear, hear.] They were, he believed, most desirous of arriving at the truth and what was best for the companies and corporations and the consumers generally. This was undoubtedly their chief aim; and they had framed their report upon the evidence put before them. In the report the *crux* of the thing was in the latitude which they were going to give the gas industry, and what the industry had never possessed before. He had himself been struggling for a very long time with the powers-that-be, begging of them to give latitude and freedom from irksome restriction. It appeared that, after all, they had had some influence, and something in the right direction had now been done. As a whole, he looked very favourably on the report, because it gave the industry an opportunity and a margin of variation in the works for altering their carbonizing systems. Of course, they could not all do everything they would like, because they had not all got up-to-date appliances, but in every case they could, he believed, if they put their heart and soul into it, improve something that existed. For instance, those with only horizontal retorts could try a bit of steaming; those with horizontal retorts and blue water gas could make a good mixture. The steaming process needed care; but he was sure it would be a very useful and beneficial thing. Many experiments had been made with a view to the conservation of coal. He had himself collected some statistics from friends who were using his firm's vertical retorts, more particularly with a view to showing the Government and their satellites that the gas makers were the true conservers of coal. Did the electrical people do anything in that direction? Not at all. Generally, the gas industry had succeeded beyond its expectations; and he had been surprised with the great saving of coal in the industry. Their own new member, Mr. Mitchell, had recently given him a report showing how he had

saved 6000 tons of coal per annum on a moderately small works; and this sort of thing in many works told a tale. The returns he had collected showed conclusively that about 16,000 c.ft. per ton of 500 B.Th.U. gas could be produced, and that about 20,000 c.ft. of 450 B.Th.U. gas could be produced per ton with moderate coal. There was no doubt that this could be obtained with general certainty. Beyond this he did not propose to go, though they had obtained 25,000 to 30,000 c.ft. per ton. He thought, however, they should say to-day that they should stop at 20,000 c.ft. of 450 B.Th.U. gas. He had made many experiments with this quality, and strongly recommended it as an excellent gas for heating and lighting. They did not yet know what might come to pass. They knew some very eminent men—Prof. Cobb, Mr. Wood, Mr. Bond, and others—were searching for the real truth, and nothing but the truth. The industry wanted to know exactly where it stood in regard to the composition of the gases and their true value. He did not go all the way with Mr. Duxbury. He said let the men who were now investigating proceed and lay before the industry their report. Their researches seemed to be going on in a satisfactory manner, and in all probability they might get good useful gas about or below 450 B.Th.U. If they could, so much the better. He believed the powers-that-be in London were awaiting the reports of these men. So far as the members of the Institution were individually concerned, he would advise them each to do all he possibly could for himself and his own works. What was their position as an industry to-day? They had had difficulties in the past. Their financial difficulties must be squared-up. They did not now know quite what Parliament was going to do with them, so it was very necessary that they should use every means in their power to give Parliament proper data to work upon. They had already some great champions on behalf of the industry in men like Sir Dugald Clerk and others; and he believed they might get through. Had anybody done more for the success of this country in the war than the gas industry? He was satisfied that the Government did not even yet appreciate these services to the extent they deserved. Was the Prime Minister with them? No; he believed in electricity. Was Sir Eric Geddes with them? He was pushing the electricity scheme. He (Mr. West) totally objected to the spending of his money, as a taxpayer, on these proposed huge electrical stations. The Government were going to rob the public in this matter. They claimed to be going to save a hundred millions sterling. All this claim was founded on nothing; they had no basis to work upon. Indeed, it was a myth from beginning to end; and, if carried out, it was more likely to result in a loss of five hundred millions. Could any society exist unless it had a scientific backing? What scientific backing had this electrical scheme? What energy did they get out of coal? They obtained about 7 or 8 p.ct. efficiency, and they hoped to get about 13 p.ct., as against the gas industry's 80 p.ct. efficiency out of the coal. The unfortunate part about the matter was that the powers-that-be did not understand the situation. Really, he sympathized with Members of Parliament, because they were ignorant of matters on which they had to vote. [Laughter.] He could prove they were ignorant, because he was in correspondence with them, and they wanted information. This ignorance placed the Members of Parliament in a false position. The wild-cat scheme of the electrical people had passed the second reading, and was coming on for Committee consideration. He would suggest something which all in the gas industry could do, and that was that they should all write personally to their local Members of Parliament explaining the real position. He had found Members of Parliament to be very courteous and anxious to learn. This had become a question of votes in the House of Commons; and the gas industry had to fight to save its own skin. He hoped all gas engineers, or their committee chairmen or mayors or company chairmen, would take this course. He considered this was the only way to turn the scale; otherwise they would be saddled with a huge expense, and no use to the community.

Mr. H. TOWNSEND (Wakefield) said the industry highly appreciated the friendly tone of the report, and recognized that the members of the Board were not unfriendly to the industry. He thought these gentlemen would themselves welcome any little light which the industry might be able to throw on their suggestions. There was a good deal of difference between the aspect of a company and a municipal undertaking on matters of this sort. A company usually had an expert appointed by the local authorities looking after its business and testing its gas to see if it complied with the various standards required. These officials looked at the matter from a hostile point of view—it was inseparable from their position. Therefore there had to be a considerable margin in the standard in order to allow the company to keep within bounds. Sections 18 and 19 of the report recognized the need of elasticity in calorific value. The industry was in hearty sympathy with this. This was the only occasion on which, so far as he remembered, anybody in authority had suggested elasticity in connection with the gas industry; and this was a big step in the right direction. Section 38 dealt with the question of inerts. There was just as much need for elasticity in this matter as in calorific value, owing to the great variation in composition of coals. The report was at variance in restricting inerts to 12 p.ct. while in section 17 it suggested the adoption of coke-oven gas. What coke-oven gas had inerts down to 12 p.ct.? Companies would have to supply stuff of 6 p.ct. inerts—practically an impossibility—in order to meet the demands of the experts' hostile tests in requiring 12 p.ct. maximum. To have a cast-iron formula like 12 p.ct. of inerts could not be worked in view of the great variety of works and circumstances. In section 40, the Board advocated starting the supply of water gas for industrial purposes within a short radius of gas-works, and in suitable localities. As long ago as 1884 he had made this suggestion himself in the Technical Press; and he was glad to see its adoption now by the Board. He was convinced, as he was in 1884, that in certain localities there was a large field for separate supply, through separate mains, of special gas. He had suggested blue water gas; and he still thought that was more suitable, owing to distribution difficulties, than a gas of lower calorific value. Whether this blue water gas were adopted, or producer gas or suction gas, it was a step in the right direction. Section 50, sub-section 7, dealt with the question of pressure, which was to be not less than 20-10ths. They all desired to give as much pressure as they could. But the report would bind every undertaking in the country to give not less than this pressure; and this meant, in the case of companies, that they would have to give always not less than 21-10ths or more pressure at the outlet of the consumer's meter in the very worst portion of the district. In the case of his own works, the worst portion was about four miles from the works. It was a mining district, in which the ground was constantly subsiding and the mains getting broken. He had replaced cast-iron mains by steel mains with 8 in. rigid joints made in the best possible manner; but the ground went on subsiding, and the joints continued to give way. They could not keep the mains tight for six months together in any of their mining quarters. This district was considerably lower than the level of the works, and about 8-10ths of pressure was lost from this cause. The pressure at the outlet of the consumer's meter depended, of course, to a material extent upon the size of the meter, the size of his service, and the amount of gas he was using, as well as upon the service and mains being fairly free from naphthalene. Other parts of the colliery district of which he spoke, not far away, were 300 ft. higher; and as it was an old distribution system, the consumption pulled the pressure down considerably when the peak load was on. So that to supply the 20-10ths at the outlet of the consumer's meter at the furthest point and lowest level which happened to be undermined, such an excessive pressure would have to be given at the works as to blow the water out of the wet meters and other water-sealed apparatus in the higher parts of the district. This would cause grave risks, either of the asphyxiation of the people or else explosions in the houses of consumers, in addition to the great increase in leakage and consequent higher price of gas. This was not a matter of theory; they had had one or two "close shaves" in their district. This was another case of the need for elasticity. When the Company applied for a change to calorific value some time ago, they were opposed by the railway companies; and the Board of Trade agreed to 15-10ths pressure at the worst part of the district, and 12-10ths at the remainder. Under the new proposal, the consumer would have to pay more money and run the risk of danger. In regard to the financial proposals in the report, Mr. Townsend said the new basis of charge must not involve any lowering of the standard price, or it would be impossible to carry on many sliding-scale companies like his own concern. In regard to section 53, sulphur purification, the present exorbitant cost of plant, and the scarcity and dearness of money and great difficulty in obtaining capital, rendered refinement in purification absolutely impossible in present circumstances. The report seemed peculiarly suitable to vertical retorts and steaming. But the great bulk of retorts in use were horizontals; and it was impossible, in the present unhappy financial position of gas concerns, to raise the necessary capital for installing vertical retorts, even if it were desired to do so. So it would be well if the report were amended so as to better meet the present requirements of the majority of existing gas undertakings. The great need of the gas undertakings was freedom to develop so as to be of the greatest service to the public at the cheapest price, and to assist to the utmost in the conservation of coal; and the less it was hampered with restrictions the better. It was useless to remove the shackles from the wrists in order to place them on the ankles. He was quite at one with Mr. Bond, Mr. Duxbury, and Mr. West in advocating freedom and the abolition of all restrictions. They simply hindered progress and killed invention. The industry did not want standards of gas; what it wanted was freedom. He hoped that, if the Fuel Research Board were going to take any notice of the day's discussion, they would note that all the speakers asked for freedom.

Mr. R. G. SHADBOLT (Grantham) felt this was the most critical time in the history of the industry, and on this account they could not be too emphatic in making clear to the authorities that they were not asking for licence, but were out to serve the community to the best possible advantage, and that some of the suggestions in the report tended entirely to the disadvantage of the public. The report asked that the charge for gas should be made on a sliding-scale basis. Although there would be some difficulty in the way, he did not think the industry would materially object if the Board of Trade would point out what they thought was the best way it could be done. The industry was out to meet the Board in every particular which would be to the benefit of the consumer or the industry. When, on the other hand, they asked them to accept a penal limitation of 12 p.ct. of inerts, they were asking too much. When they asked the industry to go in for refinements of purification which were going to cost money for no useful purpose, they were adding to the expense of production without any corresponding advantages. If they would give them liberty as business men, the members of the industry knew the needs of the public and would take no licence. They knew they had it in their power to render the best service from a fuel-saving point of view that could be rendered by any industry. On this ground, their view should be heard.

Mr. E. H. HUDSON (Normanton) drew attention to the serious effect of the proposed restrictions on small undertakings which had no considerable staff of expert assistants and chemists in addition to the manager, as was the case in larger works. The problem of such small works keeping within the requirements was a point which ought to be brought home to the powers-that-be. He felt a sense of gratitude to the Research Board for having admitted that it was within reasonable ground to allow gas authorities to sell any mixture of gas of a combustible nature. This was going a long way, and was doing away with some restrictions which had handicapped mixtures up to the present, and would enable the producers to sell cheaper gas. Coke-oven gas had been recommended. Well, he had had coke-oven gas offered to him with a guaranteed percentage not exceeding 17 of inerts. If this was coming forward as a commercial offer, what good was it going to be if the statutory limit was to be 12 p.ct. With respect to the pressure, this, it must be remembered, covered 24 hours, and not any particularly heavy load. The pressure would be taken against them at the very worst moment. Along with Mr. Townsend, he had appealed against what the Board of Trade had established as a recognized pressure of 15-10ths; and they were opposed by an array of engineers and counsel. Their arguments, however, had satisfied the Board of Trade that 15-10ths was an excessive pressure in a mining district where the bulk of the consumers were supplied at a higher pressure; but in the remainder of the district, it was not unreasonable to maintain 12-10ths. In view of this, it was rather an unreasonable jump to make 20-10ths

obligatory and penal. As to the sulphur compounds, anyone who remembered Sir George Livesey would know how much time had been spent in Parliament in thrashing-out the sulphur question. How were they going to supply cheaper gas if they were to be burdened with all the expensive inspections and processes involved in this proposal? Personally, he considered the Fuel Research Board were out to do good to the industry at large; and he felt, therefore, that their effort was not to be looked upon with fear, but that it was a beginning. After the Institution of Gas Engineers, the Manchester Institution, and the National Gas Council had thrashed this matter out with the Board of Trade, some good would come of it; and when they were faced with the final report they would have something to compensate them for all they had suffered during the war. The financial aspect of the question seemed to be entirely ignored in the report. Full regard should be paid to the increased cost of all materials, and the industry should be given a chance to pay a reasonable return on capital in order that it might be able to carry out the recommendations in the report.

Mr. WALTER HOLE (Leeds) said the questions of pressure and of dual supply were very important matters. With regard to the former, it seemed to him that there was a tendency to press the exceptional into the general. They had heard two gentlemen speak of the difficulty of maintaining the suggested pressure at the lowest parts of their district at all times of the day—those districts being largely undermined and the mains not as sound as they might be in other parts. It would, at the same time, be a great mistake to press this point unduly. It ought to be made perfectly clear that in some cases it would be practically impossible to maintain these pressures; but he should be sorry if it went forth that in all cases, or in the generality of cases, the pressure of 20-10ths at the outlet of the consumer's meter was something which the industry rather shirked. He could not conceive that a distributing system in decent working order ought not to be able to give 20-10ths except in special cases such as had been mentioned. Surely no fair-minded body would penalize any one for not giving a supply which was not due to the undertaking's own fault, but to uncontrollable circumstances or the imperfect condition of the consumer's appliances. Something had been said as to the difficulty in mining districts. In his own area, 16 or 18 years ago he had great trouble with his mains. They had complaints of escapes in the district three times a week, and were continually having mains broken. He tried many remedies, and ultimately found one which had stood him in good stead now for 17 or 18 years—that was, introducing a rubber joint into the main. It might be said by some that this would bring trouble, at any rate in three or four years' time. Well, during the whole of that 17 years or so he had not had a complaint of escape from this section, and he had applied the method to another section, where it had been equally successful. Before trying the remedy, he asked many friends, and they, though they had admittedly never tried it, said it would be useless. Only one friend did he find who had ever tried it, and that was Mr. Grafton—at that time at Southampton. He had sent some rings taken out of a pipe used for benzolized gas for nearly 30 years, and he (Mr. Hole) would be glad to show these to any friend who cared to see them at his office. It would be seen that they were as good rubber to-day as when they were put in. In regard to dual supply, this was an important part of the report. In the manufacturing districts they would have to do with a very low-grade gas as they were doing in other respects with high-pressure gas—they would have to lay another set of mains to supply the large consumers if they were going to keep them; and he was glad that the report gave the industry this advantage.

Mr. F. J. BELTON (Macclesfield), speaking of coal conservation, said that at his works for the year ending March, 1915, they used 19,000 tons and made 220,000,000 c.ft. of gas. During the past year they had made 207,000,000 c.ft., but only used 10,750 tons of coal, which worked out roughly at about 19.300 c ft. per ton. This had been done without any extra labour on the plant. In using horizontal retorts and blue water-gas plant, they had extra labour on the water-gas plant and obtained no benefit in the way of increased bye-products; whereas he had increased the tar per ton of coal from 14 to 20·9 gallons, and the ammonia had also increased to 33 to 35 gallons. At the same time the calorific value had been reduced from 550 to 450 B.Th.U., and the 450 B.Th.U. gas was giving complete satisfaction. No extra men had been required on the plant; and the capacity of the plant itself had actually been increased. He had come to the conclusion with regard to his plant that, with a given type of plant and certain method of heating, there was a point beyond which it did not pay all round to reduce the calorific value or try to increase the make. With regard to inerts, Dr. Davidson, in London, had mentioned the flame temperature question in furnace work. They had not heard how this gas with 38 or 40 p.ct. of inerts answered in the furnaces. If they were given freedom in the composition of the gas, each man would be able to settle for his own area what he was going to send out. If he had a lot of metallurgical furnaces in his district he would have to keep his inerts low. The sulphur clauses ought to be knocked-out entirely. In his own case of steaming, the sulphur in the gas was very much reduced. Before they were steaming, they got 25 to 30 grains of sulphur per 100 c.ft.; but now they got only 12 to 16 grains. As to Mr. West's suggestion of approaching members of Parliament, he might say that one of his own committeemen, who had been interested in low-temperature carbonization, had borrowed from him a copy of Prof. Cobb's article in the "Edinburgh Review," and asked to be allowed to send it to the local Member, who was strongly in favour of the electrical scheme. He thought engineers might well do something more in the way of educating their own committees and corporations in this important matter.

The PRESIDENT (Mr. A. E. Mottram) said he was given to understand that the sulphur clauses were likely to be withdrawn. so that would be a move in the right direction. The keynote of the discussion that day was that they were asking for freedom, but without licence, as Mr. Shadbolt had observed.

Mr. BOND, in reply to the discussion, said most of the members seemed quite in agreement with his remarks. Mr. Duxbury had pointed out that it would be in the interests of consumers to have a dual supply. He entirely agreed, although Mr. Duxbury was living in hopes of supplying gas of very low calorific value. He thought that if Mr. Duxbury went on it would be unnecessary to have a dual supply in Oldham. He had been very interested in Mr. Townsend's remarks, especially in reference to the pressures. The object of the Research Board was to save coal. If they put undue pressures on such districts as had been specially mentioned by Mr. Townsend, there would be a tremendous waste of the fuel which it was desired to conserve. Mr. Townsend had also referred to the sliding-scale charges. This should have been taken into consideration by the Board before they presented the report. Mr. Hudson had pointed out the importance of the fact that coke-oven people were willing to supply gas containing 17 p.ct. of inerts, which the gas industry would be unable to accept if restricted to 12 p.ct. As to the pressure, he had installed a great number of gas appliances in his own house. He had appliances which would consume up to 600 c.ft. per hour if they were all lighted at the same time. This meant that if he wanted to put them all on at once he would have to instal a 100-light meter, whereas, for his own requirements, he was content with a 20-light meter. If an inspector came to his house and he was consuming gas with a pressure of 30-10ths at the outlet of the meter, he could give the inspector a pressure of down to 5-10ths, or a variety of pressures, while he was taking his test. He had been greatly interested in the point as to sulphur compounds. The more they steamed the less sulphur would they find per 100 c.ft. of gas on their supply system. It would be a very important thing if they could forward the report of this discussion to the Board of Trade as well as to the Fuel Research Board. The more information the Board obtained the better they were satisfied.

Mr. HOLE asked permission to say that he was quite at one with Mr. Bond in thinking that the pressure should be taken at the producer's main rather than at the meter outlet.

A VISIT TO HAMPTON WICK

BY THE LONDON AND SOUTHERN JUNIOR ASSOCIATION.

It was a very long time indeed since it had been possible to arrange an afternoon outing for the London and Southern District Junior Gas Association; and this fact, no doubt, caused the members to look forward with more than ordinary interest to the visit announced for last Saturday to the works at Hampton Wick of the Hampton Court Gas Company. But whatever may have been the anticipations, it is safe to say they were justified by the realization. All was done that could be done by a thorough guide and genial host—for Mr. W. E. Price (the Engineer and Manager of the Company) fills both parts to perfection; and to his kindly welcome there was added that of Mrs. Price and their three daughters. Besides this, the weather was kind; Nature, in a pretty part of the country, looked its best; and the preliminary announcement had read that "ladies are specially invited to join members on this occasion."

An inspection of the gas-works, of course, came first; and for this purpose the visitors (who included the President, Mr. S. B. Chandler) divided up into parties, headed respectively by Mr. Price and his Assistant, Mr. Hodder. One of the principal features—which was not pointed out, because the members were at once struck by it—was the all-pervading air of orderliness in this riverside gas-works, which it was difficult to believe were but a dozen miles or so from the heart of the Metropolis. The works were built some seventy years ago by Mr. R. P. Spice, under the superintendence of Mr. E. Price, the father of Mr. W. E. Price. The annual output is now about 260 million c.ft.; and the retort-house is capable of producing about 1½ million c.ft. of gas per day—the make of coal gas being approximately 13,000 c.ft. per ton. Coal is received by rail and water, and is deposited in a hopper below the ground level, from which (after passing through a crusher) it is discharged by a bucket-elevator on to a push-plate conveyor running the whole length of the retort-house, with continuous coal-bunkers immediately below.

The tour of inspection was so timed that the visitors should see in action the Fiddes-Aldridge discharger-charger, which, with the coal-handling machinery just referred to, is driven by electricity generated by gas-engines on the works. The exhauster-house, in addition to three sets of Waller exhausters, contains a dynamo set; the current being employed for lighting the tar and benzol plants. There are two Livesey washers, a tower-scrubber, and a "Standard" washer-scrubber—the last-named driven by an engine which has been on the works for sixty years, and which Mr. Price declared must be nearly a hundred years old. There is a Walker patent purifying machine for use as a duplicate purifying unit, or for oil-washing for the extraction of benzol. One of the Livesey washers is employed, with water-gas tar or paraffin, for the extraction of naphthalene.

Special attention was devoted to the set of four elevated luteless purifiers, each 30 ft. square, by 5 ft. 6 in. deep, by Messrs. R. Dempster & Sons. These purifiers, Mr. Price pointed out, are of 2 million c.ft. per day capacity; so that there is plenty of elbow room in this respect. Having plant of this ample size, and working on the backward rotation system, it is not necessary to empty a purifier for the purpose of changing the oxide more often than once in twelve months. Purification is therefore not one of his troubles. It was emphasized by Mr. Price that as, by the backward rotation system, the gas goes in at the top and out at the bottom, where it first comes in contact with the oxide it is all oxide, and not half oxide and half wood. If pressure occurs, all that is necessary is to remove the lids, take a pickaxe, and break up about a foot of the oxide.

Water gas is generated in two Humphreys and Glasgow sets, each of half-a-million cubic feet capacity, with blowers driven by

De Laval steam-turbines. A Thorp and Marsh rotary meter was fixed near the exhauster, where it was found the pulsation interfered with correct registration. However, an anti-pulsator between the exhauster and the meter remedied this defect. Three flat-flames were on view—the burners being fed respectively with straight coal gas, blue water gas, and a mixture of 75 p.ct. of the former with 25 p.ct. of the latter. The water gas (blue or carburetted to meet requirements) is regulated according to the quality of the coal gas at different stages of the carbonizing period, and is mixed with the coal gas at the inlet of the Parkinson and Cowan station-meter.

In connection with the 1 ton per day sulphate plant, a Feldman ammonia extractor is used. In 1916, a Bale and Hardy tar dehydrating plant was installed. A vertical flat coil is used in the furnace; and the vapours pass through a dephlegmator before the final condenser. By this means a large quantity of naphthalene is separated, together with heavy oils. The light oils being isolated from the heavy oils to a great extent are of better quality, and command a higher price. The heavy oils, after cooling, and being separated as much as possible from naphthalene, are used for benzol extraction. While an inspection was being made of the Wilton benzol plant, Mr. Price explained that during the time it has been in use a considerable quantity of benzol has been extracted by it, but that of late it has been altered, and made rather successful as a naphthalene extractor, by making an extension to the condenser for the purpose of taking out naphthalene from the wash-oil and the benzol produced. Some of the benzol has been put back into the gas when it has seemed necessary.

"Naphthalene" has been mentioned a good deal in the course of these brief notes; but somehow this will seem natural to those who remember the investigation into this troublesome subject that was carried out a good many years ago under the auspices of the Southern District Association of Gas Engineers. Even before that time, Mr. Price had a device in use, of which he was the inventor, for dealing with naphthalene. He was, in fact, one of the first to adopt this type of remedy; and quite a number of works have had his method in operation for years past. His own apparatus was seen by the members on Saturday in use, as it has been effectively day and night for some years. It is the "Simplex" vaporizer, and is fixed on the inlet trunk-main to the station-governors. About 12 gallons of oil per million c.ft. of gas are evaporated on a heated plate, over which a plentiful flow of gas is maintained. One other appliance seen which should be mentioned is the Simmance patent "Calorgraph," of which Mr. Price speaks very highly, when used in conjunction with a calorimeter.

The inspection concluded, the visitors prepared themselves for the second part of the programme; the Hon. Secretary (Mr. G. Winslow) having intimated that tea would be provided by the Company. It was served in Mr. Price's pretty garden, and proved a delightful function—amply deserving of the appreciative remarks subsequently made by the President, Mr. J. Hewett, Mr. D. J. Winslow, and Mr. W. J. Liberty. The thanks of the visitors for all that had been done for them were hearty, and were duly acknowledged by Mr. Price.

An Objectionable Revival.

An instance has been brought to notice of the revival of the "Circular of Enquiry Nuisance," to which general objection is naturally taken. The secretary of a comparatively small gas company undertaking has been "instructed" by his directors to secure answers to eleven questions (some of which are of quite a private nature), which will be treated, he says, "in strict confidence;" and there is the usual offer "to reciprocate . . . at any time." The questions were: 1. Share and loan capital. 2. Profit for the last twelve months. 3. Dividend paid for the same period. 4. Tons of coal used per annum. 5. Number of feet of gas made per annum. 6. Number of feet of gas sold per annum. 7. Present price per thousand. 8. Number of men employed. 9. Salary of manager in 1914. 10. Salary of manager at present time. 11. Total value per annum of other emoluments given to manager—including house rent, coal, gas, rates, taxes, bonus, and income-tax, if paid by the Company.

Temporary Increase of Charges Act.—Orders have been made by the Local Government Board under the Statutory Undertakings (Temporary Increase of Charges) Act, enabling the Burnley Corporation to raise the maximum price of gas from 3s. 6d. to 4s. 6d. per 1000 c.ft.; the St. Ives (Cornwall) Corporation, from 5s. 6d. to 7s. 6d. per 1000 c.ft.; and the Skipton Urban District Council, from 3s. 6d. to 5s. per 1000 c.ft.

Importation of Chemicals.—The Board of Trade desire to give notice that, whereas the Prohibition of Import (No. 32) Proclamation of the 25th ult., prohibits, *inter alia*, the importation of all chemicals, the terms of the prohibition have been thus widely drawn solely for convenience of administration, and that it is not the intention at present to do more than control the entry into the United Kingdom of certain classes of chemicals of a high degree of purity. The Department of Import Restrictions will therefore almost immediately issue general licences for a large number of chemicals which are not of this description; and they will also issue licences in suitable cases, and for limited quantities, of the chemicals which are retained under control. For this purpose, the Department will be assisted by a Committee now in process of formation, which will contain representatives of official, scientific, and trade bodies connected with the chemical industry.

MIDLAND JUNIOR GAS ASSOCIATION.

Visit to the Stafford Gas-Works.

Last Saturday week, members of the Midland Junior Gas Association, to the number of 45, paid a visit to Stafford, where, by the courtesy of the Stafford Gas and Electricity Committee, they inspected the Corporation gas and electricity works. The party were met at the railway station by the President of the Association, Mr. T. H. Poulson (Chief Assistant at the Stafford Gas-Works), and at the works were received by Mr. W. M. Valon (the Engineer and Manager). An official welcome was then extended by Alderman T. Westhead (the Chairman of the Committee). Under ideal conditions, the visitors were enabled to see the various interesting details of gas plant, which were pointed out by Mr. Valon, Mr. Poulson, and Mr. J. Poulson (Chemist). The works are built on piles, on account of the marshy character of the ground; and the need for careful piling was apparent. The new installation of continuous vertical retorts on the Glover-West system, which was started-up on June 16, was seen to be working smoothly; the old horizontal plant having been shut-down. The new M'Laurin washers, vertical type, working on ammonia extraction, were another interesting feature; and one of them had been opened to allow of an inspection of the arrangements for spraying in the various bays. A partly constructed holder and steel tank was seen, and the arrangements for inlet and outlet mains noted. A further object of interest was the exhausting plant, consisting of one 100,000 c.ft. per hour and one 60,000 c.ft. per hour four-blade Waller exhauster. Each exhauster has an extended crank shaft, to which a water-pump is fixed. Both engines are fitted with metallic packings.

The Mayor of Stafford (Mr. J. Rushton) and members of the Committee joined the visitors at tea at the Vine Hotel.

The toast of the Committee was submitted by Mr. T. H. POULSON, who pointed out that they were justly proud of the Stafford Gas-Works, to which further improvements would be made. The officials were encouraged by the Committee to maintain a high standard of efficiency; while in relation to the question of salaries, a sympathetic attitude had been adopted.

Acknowledgment was made by the MAYOR, who expressed the opinion that the gas plant was a long way on the road to perfection. They had a most efficient engineer and staff; and he looked with confidence to the development of the gas industry generally.

Mr. W. J. PICKERING (new Senior Vice-President of the Association) proposed the toast of the Gas and Electricity Officials of Stafford, paying tribute to their well-directed efforts to make the visit a success. He said the smoothness of working of Stafford's up-to-date gas-making plant, including the new carbonizing unit, reflected much credit on the management. All were impressed by the cleanliness of the plant, which tended greatly towards increased efficiency.

Mr. W. M. VALON replied, and remarked upon the value of the Association. Since its formation, the calibre of the junior men had been much improved. During the period the Association's President had been at Stafford as Chief Assistant, great advances had been made, which were some indication of the energy and efficiency he put into his work. He would like them to visit the works again later, when the plant alterations had been completed. Their vertical retort installation was the latest type of Glover-West, with a nominal make of 250,000 c.ft. per bed. The "heats" were not yet up to the maximum figure; but even so the make per bed had reached 300,000 c.ft. The quality was about 580 B.Th.U. gross, which would be reduced later to 500. They were proud of their works, and the leading position they occupied. Their aim had always been to give a steady supply of gas as regarded quality; and he ventured to prophesy that they would be sending out, in the near future, as cheap a gas, for its heat value, as any undertaking in the country.

Mr. W. H. ROBINS (Electrical Engineer) also replied to the toast.

Alderman T. WESTHEAD, proposing the toast of "The President," said he had known Mr. Poulson practically all his life; and when they wanted a successor at Stafford to Mr. Poulson's father, the Committee were unanimous in inviting Mr. T. H. Poulson to take the position of second in command. It was the greatest compliment he could pay their President to state that the Committee's choice had been justified in every way.

The PRESIDENT, in reply, said he felt proud of the work done during his five years at Stafford. He left an up to-date works at Nelson, to come to a works which, by reason of the difficulties due to ground subsidence chiefly, was thirty years behind the times in certain ways. The retort-house was not strong enough, for instance, to carry a charging machine; hence all hand work was in vogue. However, they had succeeded in supplying a good cheap gas under such conditions; and with the new plant, which was the best of its kind, they hoped for still better results. The plant had only been working for a few days, and so far they had had no hitch of any kind.

Mr. W. M. VALON then proposed "The Contractors"—Mr. R. J. Milbourne, of Messrs. C. & W. Walker (Donnington), and Mr. Clegg, of the Glover-West firm. He mentioned that the contract for the verticals, including the coke plant, which was not yet installed, was for £24,000, and for the holder job £16,000. When he pointed out that similar work at the present time would cost at least £73,000, they would see it had been a wise policy to push on with these contracts during the war period.

Mr. R. J. MILBOURNE, in reply, said it had given him much pleasure to be with the members. Stafford was rightly proud of its gas-works; and he ventured to say the Corporation could be proud of their gas officials. In the work of the Gas and Electricity Committee, they saw municipal enterprise at its best, manifesting an interest which reminded them more of a board of directors. Speaking of the holder job, he said that the material for the tank had been made five times over; and he could say with literal truth that some of the original sheets had

assisted in beating the Germans. The first 0·75 gun made at Coventry for the air defences of London was constructed from the bottom plates of the tank. They had come to a satisfactory arrangement in reference to the contract price; and though his firm would lose on the job, he felt it to be a great pleasure to do work for the Stafford Corporation. He spoke of the work carried out by the President's father, who engineered in very courageous fashion the raising of the purifiers, and succeeded in levelling them—employing no fewer than 54 jacks on the job at one time. He had faith in the future of the President, and wished their Association every success. He concluded by inviting the members to visit his firm's works at Donnington, where there was much of interest for them to see.

The PRESIDENT at once accepted Mr. Milbourne's offer, and said they would be very glad to avail themselves of the invitation.

ILLUMINATING ENGINEERING SOCIETY.

Annual Report of the Council.

The Annual Meeting of the Society was held last Tuesday at the Royal Society of Arts—Prof. W. C. CLINTON in the chair.

The HON. SECRETARY (Mr. L. Gaster) presented the annual report of the Council. It commenced with a reference to the cessation of hostilities, and to the anticipation of the resumption of more normal conditions in regard to lighting.

The Society has been fortunate in securing the continued support of Mr. A. P. Trotter as President, and of Mr. F. W. Goodenough as Deputy-Chairman of the Council. In accordance with the arrangement entered into with the Institutions of Gas and Electrical Engineers, Mr. Samuel Glover and Mr. C. H. Wordingham, the acting Presidents of these bodies during the past session, consented to become Vice-Presidents and Members of Council during their tenure of office. The Council are pleased to record that Sir Dugald Clerk, as President of the Institution of Gas Engineers during the coming session, has similarly consented to fill these positions. Recognizing the benefit of the opportunity of co-operation which this arrangement affords, the Council have determined to apply it to several other bodies dealing with subjects of common interest—such as ophthalmological and architectural bodies. The assistance of the Electrical Contractors' Association, whose members are actively concerned in the equipment of lighting installations, has been likewise secured.

The report also epitomized the work done during the year. It then referred to the formation of new investigating committees—viz., Committees on Office Lighting, Railway Lighting, and Stage Lighting; a Committee on Lighting Conditions and Eye Strain in Cinema Theatres; and Committees on Flares and Radioactive Self-Luminous Materials. Mention was next made to co-operation in the British Scientific Products Exhibition; and then dealing with research in illuminating engineering, it was remarked:

> The present moment is a favourable one for the initiation of research in the field of illuminating engineering; and in the future there should be many opportunities for embarking on such inquiries with the co-operation of kindred societies and associations. The Committee on Illuminating Engineering, formed under the Department of Scientific and Industrial Research in 1917, affords a valuable medium for the prosecution of research demanding such concerted action, and especially for such inquiries as are too extensive to be undertaken by an individual. The Committee are also prepared to consider any investigations which individual members of the Society may desire to carry out with their help; and the Hon. Secretary of the Society will be glad to convey any such applications.

The report alluded to a conference with the Society of Glass Technologists on the subject of the manufacture of illuminating glassware. The following resolution was passed:

> That this Conference is of opinion that the shortage of illuminating glassware is growing to such an extent that it is essential for the Government to give every facility for the manufacture in this country of such glassware, and that lamp chimneys, bulbs, globes, &c., are considered to be of the nature of a semi-key industry.

With a view to ascertaining the position at the moment and in the immediate future, it was agreed that the Illuminating Engineering Society should endeavour to obtain the necessary statistical data. The resolution was duly conveyed to the authorities concerned. While changing conditions led to the inquiry not being pursued in detail at that time, it would appear to be a profitable subject for investigation now, in view of the future of the illuminating glass industry in this country.

The report also referred to matters which have affected lighting during the war; and special stress was laid on street-lighting reconstruction problems [a discussion on the subject is reported elsewhere in this issue], and upon industrial lighting. An appeal was made for additional support for the Society; and observations were offered as to future activities, which show a tremendous scope for valuable work.

The report was adopted; and the Council and officers were thanked for their services. Hearty thanks were also tendered to the Society of Arts for their generosity in providing accommodation for the meetings.

The twelfth annual convention of the Canadian Gas Association will be held at Niagara Falls on Aug. 21 and 22.

COKE-OVEN MANAGERS' ASSOCIATION.

(MIDLAND SECTION.)

Visit to the Works of Messrs. W. C. Holmes & Co., Ltd.

The members of the Midland Section of the Coke-Oven Managers' Association, under the presidency of Mr. J. A. WILSON (Staveley), last Saturday afternoon paid a visit of inspection to the Whitestone Iron-Works, Turnbridge, Huddersfield, of Messrs. W. C. Holmes & Co., Ltd.

The visitors were received by Messrs. D. M. Henshaw and H. A. B. Gray (Directors), in the absence, through illness, of Mr. Holmes (the Chairman of the Company), and were divided into small parties under the guidance of Mr. Henshaw, Mr. Gray, Mr. C. Cooper (Chemist), and Messrs. J. E. Whittle, C. Harrison, C. Matthew, and W. Crossley, of the staff. The tour included the whole of the pattern shop, foundry, mechanics' shop, gasholder and structural shops, offices, &c., and the visitors were shown the equipment for dealing with materials from the raw pig iron to the finished part. Among the plant in course of construction for coke-oven installations were continuous stills of the Hird patent type for tar distillation, several orders for which had recently been placed with the firm by coke-oven owners who are now making preparations for dealing with their own bye-products. A continuous still for the fractionation of benzol, recently patented, was also seen, and attracted considerable interest—a plant being under construction capable of dealing with 10,000 gallons of crude benzol per day, and producing benzol, toluol, and solvent naphtha simultaneously. Other plant seen included centrifugal washers for benzol and ammonia recovery. A complete installation of these washers had recently been delivered to the Partington Steel and Iron Company, for their new ovens.

The visitors were greatly interested in the Company's coke-oven valves, air and water cooled, condensers of various types, tar extractors, &c. In the course of the examination and in his description of the valves, Mr. Henshaw remarked that there had long been a lot of nonsense talked about the amount of material for coke-oven plants coming over from Germany before the war. As a matter of fact, the German undertakings did not get anything like so much of the actual business as was talked about, and many of the parts of the German equipment were made by British concerns. Messrs. Holmes & Co. themselves had been supplying valves to all coke-oven builders since about 1890. Indeed, there had been very few valves bought from the Continent since then. It was quite a mistaken notion to think that the coke-oven plants of this country had been built chiefly of German material. His Company had been supplying plant of every description for coke-oven equipment for the past 20 or 30 years. Attention was drawn to the firm's work in tar dehydrating plant for gas-works of all sizes; about 18 orders being in hand at present. It was not possible, of course, to show everything included in the firm's operations in a complete state; but the visitors were able to examine drawings and models, in the offices, of the plant which particularly interested them.

THE GUESTS OF THE COMPANY.

After the inspection, the guests were provided with tea in the drawing offices.

The PRESIDENT, in closing the proceedings, said they had all spent a most interesting afternoon.

Mr. T. B. SMITH (Stocksbridge), in proposing a vote of thanks to Messrs. Holmes & Co., and to Messrs. Henshaw and Gray and their colleagues, remarked that most of the coke-oven managers were drawn from two sources—one was essentially the chemist, and the other the engineer. The chemist did not always have the full insight into the engineering side of the plant which would be most desirable, and it had been a great pleasure to him personally that day, to have the opportunity of picking up some information on the engineering side. Some coke-oven managers had had the privilege of being on the job when their plant was under construction, and therefore had the advantage over those who were not so placed, and did not really know all that was inside the plant, and had to take the word of the builders entirely. It had therefore been of great interest to be able to see the various parts of the apparatus in the making and before they were assembled.

Mr. J. A. DAVY, seconding the motion, said such a visit always provided a valuable insight into things. Personally, he had seen a good many plants erected, and he was not sure whether it was such a great advantage over the other man as Mr. Smith had suggested, so long as the maker's word was reliable and one obtained the efficiency out of the plant. The proposition was carried.

Mr. HENSHAW, replying on behalf of the firm and his colleagues, said it had been a pleasure to entertain the coke-oven managers. Mr. Smith, in his remarks, had made out a good case for closer co-operation between coke-oven managers and makers. It had not, in the past, always been possible for managers to be in direct touch with the makers; but he thought in the future it would be found possible to get a little more into such contact, much as the members of the older gas industry had done. If any of those present would like to individually visit the works or ask any questions by correspondence, the Company would be glad to give what help they could. Mr. Henshaw said he was asked to offer apologies on behalf of Mr. Holmes, the Chairman of Directors, for his absence, under doctor's orders.

THE NEXT MEETING.

The President announced that the next gathering of the section will be on July 26, at the Grimesthorpe Gas-Works of the Sheffield Gas Company.

STREET-LIGHTING RECONSTRUCTION PROBLEMS.

By L. GASTER.

[Abstract of the Introduction to a Discussion at the Meeting of the Illuminating Engineering Society last Tuesday.]

Street-lighting problems were receiving much attention at the hands of members of the Society shortly before the war—notably in the paper dealing with the Standard Clauses for a Street Lighting Specification, read by the President (Mr. A. P. Trotter), on April 15, 1913, while the present author, in a paper on the "Lighting of London," before the London Society on Feb. 10, 1914, made a plea for the treatment of the lighting of the Metropolis as a whole, and on a uniform basis.

EXPERIENCES DURING THE WAR.

The treatment of street lighting in London during the war falls into three distinct periods. There was first a progressive and somewhat indiscriminate diminution in light by reducing the number of lamps lighted, and restricting the pressure of electricity or gas supplied to them; secondly, a period when further diminutions were made by masking lights so that only a narrow cone of light was shed on the roadway in the vicinity of lamps; thirdly, the period when the authorities, acting on expert advice, substituted diffused lighting, by coating a portion of the lanterns with white distemper. The latter method helped to eliminate the objectionable contrasts in brightness and produced a more uniform effect. Immediately after the armistice, a fourth period was entered upon—the restrictions relating to screening being withdrawn, and pre-war lighting rendered permissible, subject to 50 p.ct. reduction, in the interests of the economy of coal. It is anticipated that this last restriction will also be withdrawn in the near future, after the signing of Peace.

In the revulsion from these restrictions, people are naturally inclined to a restoration of pre-war conditions. But we should seek to profit by the experience of the past years, and aim not merely at restoration, but improvement in street lighting. From this experience, two points stand out prominently:

(1) The value of diffusing appliances in lessening glare and excessive contrasts in brightness;
(2) The desirability of uniformity of practice as regards the principles of street lighting throughout the entire Greater London area.

STREET ACCIDENTS AND PUBLIC LIGHTING.

From the official data as at present presented, it is difficult to draw definite conclusions regarding the effect of diminished lighting in causing street accidents. During the war period, accidents at first increased greatly; but subsequently they diminished in the latter part of 1918, when the lighting was improved. In the period 1913-15, fatal accidents increased 34 p.ct. by day, but 63 p.ct. by night; and non-fatal accidents 6 p.ct. by day, and 21 p.ct. by night. This indicates that diminished lighting was a contributory factor. The author has recently drawn up a schedule for the collection of data on a uniform basis, enabling the relation between public lighting and accidents to be traced. Owing to depleted staff and pressure of special work, the authorities were unable to undertake the suggested collection of statistics during the war, and much valuable information has thus been lost. But there is still time for this schedule to be applied to the reconstruction period.

PUBLIC LIGHTING AND TRAFFIC CONDITIONS.

During the war a great stimulus to the study of street lighting in relation to traffic has been given by the work of the Lighting Sub-Committee of the London "Safety First" Council, on which the Society is represented. Among others, the following points have been emphasized: (*a*) The desirability of using diffusing glassware on street lamps installed in the reconstruction period; (*b*) the planning of street lighting in such a way as to avoid extreme contrasts in illumination in passing from a side street to a main street, or in passing from one borough to another; (*c*) the provision of special lighting to facilitate the guidance of traffic—*e.g.*, at important crossings, dangerous turnings, &c.; (*d*) the provision of light at regular stopping places for vehicles, and, in the case of buses, the selection of stopping places at points where a street lamp is lighted; (*e*) that in restoring street lighting, attention should be devoted first to important routes of traffic; (*f*) the desirability of consultation among local authorities with a view to uniformity of practice in regard to street lighting, and (*g*) the survey of thoroughfares with a view to their classification according to the Standard Specification for Street Lighting in order of importance and illumination requirements.

ILLUMINATIONS IN CELEBRATION OF PEACE.

During the period of the celebration of the signing of Peace, it is desirable that brilliant unshaded lights at a low level, such as are apt to distract the attention of drivers and pedestrians, and prove prejudicial to traffic, should not be used; but instead concealed lights should be employed to illuminate suitable mottoes, emblems, &c. Such devices might also preferably be used instead of flashing signs; or, if the latter are employed, they should be situated at a high level, out of the direct range of vision of persons in the street. One of the best Peace mementos would be the placing of the lighting of London on a more satisfactory and uniform basis. Among other measures, the permanent lighting by concealed lamps of public monuments serving as mementos of the war may be suggested.

GENERAL PROBLEMS IN STREET LIGHTING.

Among other questions that require study are: (1) The choice of illuminant. (2) The mode of lighting—*e.g.*, by centrally suspended lamps, staggered posts, posts in centre of road, combination of central suspended lights and side lights. (3) The distribution of light—*i.e.*, the percentage of light from public lamps that should be directed on the street surface. (4) The design of fittings, fulfilling satisfactorily the dual purpose of diminishing glare and achieving uniformity of illumination. (5) The extent to which private lighting—*e.g.*, exterior lamps outside shops, theatres, places of entertainment, &c.—can be co-ordinated with street lighting so as to be an aid, and not a menace, to traffic. Some degree of supervision over such private lighting is essential, so that it may not be in conflict with the intentions of public lighting.

Much remains to be done in the design of fittings, especially for use with the gas-filled lamp which will doubtless be used largely for future street lighting. The distribution of light needs special care; but there is general agreement that the greater part of the light should be directed on the roadway, where it is chiefly needed. Street lighting requirements are now quite different from what they were a few years ago, in view of the great increase in the volume of traffic, and the high speed of motor vehicles.

LIGHTING OF ARTERIAL ROADS, IMPORTANT THOROUGHFARES, PUBLIC SQUARES, PARKS, &c.

It is admitted the lighting of London has developed chaotically. In many cases, the lighting provided is determined by some extraneous factor and even by caprice, rather than by the reasoned study of what the road demands. This is illustrated by the sudden transitions from one system to another, even along one and the same thoroughfare. The matter is of special consequence in connection with arterial roads. Thus a person travelling from the Mansion House westwards along the Cheapside-Newgate Street-Holborn-New Oxford Street-Oxford Street-Bayswater Road artery meets many different systems of lighting, and sudden transitions in the amount of illumination provided. Proceeding eastward along the Aldgate High Street-Mile End Road-Whitechapel Road route, he meets similar inconsistencies. Occasionally, as in the case of Whitehall, sudden changes both in system and brightness take place within a short length of street. In proceeding to an important square or traffic centre, the illumination should increase gradually; there should be no sudden contrasts. The passage from the brilliant illumination of Whitehall to the subdued lighting of Westminster Square on the south, or the irregular and varied methods of lighting in Trafalgar Square, is in the nature of an anti-climax. The appearance of important streets and squares by night would be much improved by the proper planning of the lighting as a whole, and the design of more artistic forms of fittings and posts.

CO-ORDINATION OF PUBLIC AND EXTERNAL PRIVATE LIGHTING.

A difficulty in street lighting is the darkness of surrounding surfaces, which prevents good diffusion of light, occasions sharp shadows, and accentuates the glare from light sources seen against this dark background. These conditions might be improved by co-ordination between public and private lighting. If suitably shaded and diffused, such external privately installed lamps would yield valuable assistance to street lighting. Municipalities might consider co-operation with the consumers in main thoroughfares, allowing a concession in charges if requirements as regards uniform procedure in equipping lamps were adopted. Similarly the appearance by night of important streets and squares would be much improved if some light, not necessarily a large amount, were allotted to the illumination by concealed lamps of public buildings, national monuments, &c. Another important factor is the illumination of the nameplates of streets; and the more general use of mildly-illuminated plates indicating the nature of buildings would also be helpful.

CO-OPERATION IN DEALING WITH THE LIGHTING OF LONDON ON A UNIFORM BASIS.

In view of the concerted action taken by street-lighting authorities throughout London during the war, the moment is ripe to renew the suggestion for a continuation and extension of such co-operation in the future. For the moment, it is suggested that an Advisory Committee should be formed, on which this Society, the London "Safety First" Council, and the chief authorities interested should be represented, in order to prepare recommendations for the lighting of London on a uniform basis, and in accordance with commonly acceptable principles, and to offer assistance in connection with any local problems that may arise.

[The paper was illustrated by a number of interesting lantern slides, showing pre-war and wartime lighting, as well as the gradual improvement of the latter.]

DISCUSSION.

Mr. F. W. GOODENOUGH (the Chairman) remarked that the members were much indebted to Mr. Gaster for his interesting discourse

on street-lighting problems, and his criticism of the diversity of the methods of lighting in London, which, in other words, was a criticism of the diversity of the views on lighting of the administrative bodies of London. There was no system of lighting in London; only a variety of samples. Mr. Gaster spoke about a good reason for the differences of lighting in different parts. He (Mr. Goodenough) knew of no good reason, except that they had in existence forty to fifty lighting authorities. Mr. Gaster had suggested that the Minister of Ways and Communications, as it was to be the authority dealing with traffic, should take over the lighting of the roads. He assumed that this would mean from John o'Groats to Land's End. [Laughter.] If the lighting of roads was a matter with which the Ministry of Ways and Communications should deal, he (Mr. Goodenough) did not see why the paving of the roads should not also come into their hands; and then they would begin to remove the thoroughfares from the control of the local authorities. There Mr. Gaster was suggesting a very big proposition. As to the arterial thoroughfare from the Mansion House to Bayswater, there were six different authorities dealing with this road, which accounted for the variations in the lighting. Regarding the importance of not having too wide variations between the maximum and minimum lighting of streets, his (Mr. Goodenough's) comment on this was that a great deal depended on the minimum, as, if the minimum was sufficiently high, the extent of the variation did not matter much. By day, they had great variation between maximum and minimum, in passing from sunlight to shade. If the minimum of light to shade was sufficiently high, this made the factor of variation unimportant. Everything was to get an adequate minimum amount of light in the streets. He agreed that kerb lighting was very important. This always had seemed to him a strong argument against centre lighting, as naturally the traffic all tended to cast a shade on the pavement from the lighting. What was wanted was a combination of centre lighting and staggered lamps along the sidewalks. A great deal of stress had been laid by Mr. Gaster upon the shading of the lamps so as to get diffusion. Personally he thought this was unnecessary above a certain candle power. He did not think anything under 250 or 300 candle power needed to be shaded for the purpose of diffusion. It was only when they got to more powerful lamps; otherwise they would be wasting a great amount of energy by giving a good lighting lamp, and then screening it down. The question of lighting-up monuments depended upon their notion as to the artistic value of the monuments of London. He thought there were a good many monuments that were better seen in the shades of night than in the light of day. A good deal of discrimination would have to be exercised as to which monuments should be illuminated at night. The serious part of this would be the extra cost of the street lighting, which was bound to be on the rise with the increased cost of gas and electricity. He was afraid the prices would be up for a long time to come; and they would, owing to the extra cost, have a struggle to get the local authorities to continue to light the streets as well as they were before the war, without suggesting the spending of extra money on lighting more or less artistic monuments. Then the proposal to co-operate with the shopkeepers in the lighting of the streets presented certain difficulties in practice, because the time the shopkeepers kept their premises open and illuminated did not coincide with the time the streets needed to be best lighted. Some thoroughfares in London had very heavy traffic after the theatres closed; and some streets required good lighting all night for, after the theatre traffic, the early morning market traffic. So he was afraid, if they depended upon the efficient lighting of streets by co-operation with the shopkeepers, they would find themselves in difficulties. He had suggested some difficulties to the ideals as to reform. At the same time, he felt that the lighting of London and other cities needed to be greatly improved, and particularly in regard to co-ordination; and if Mr. Gaster could co-ordinate the views of the government of London on this particular matter, he would deserve to be thanked by his fellow citizens.

Mr. J. G. Clark said they had listened to an excellent and interesting review of the situation with regard to public lighting; but this was not the occasion on which they could discuss the technicalities of such a vast and complicated problem. The war had taught them a good deal. They knew now some of the things that they ought to have done, and some of the things which they ought not to have done, and must avoid in the future. He supposed the ideal system of public lighting would be one by which the streets were illuminated to an equal degree. Such a case would be the Mecca of public lighting; but it was out of the question, mainly on the ground of expense. The next best thing they could do was to avoid the contrasts from one street to another by grading the illumination between the two. Attempts had been made to do this—for instance, by, in an important thoroughfare with rather high-power lamps, placing lamps so that some of light penetrated down the side streets. This supplied a gradual transition from the high-power lighting to the lower power, or *vice-versâ*. Outside shop lighting would still be a difficulty. Shopkeepers would always have their lamps—just as much as before the war. But it did seem to him something ought to be done to divorce the shop lighting from the public lighting by pressing for the adaptation of the lamps so that they would illuminate the shops, but would not throw out their light on to the thoroughfare. In this way, when the shop lights were extinguished, the lighting of the thoroughfares would not be so much depreciated. This was a problem well worth consideration. As to the question of uniformity of illumination in the streets, this had been discussed on dozens of occasions, and quite a variety of opinions existed. He referred to some American investigations, in which the conclusions were arrived at that anything approaching uniformity was undesirable; that, providing the minimum illumination was sufficient, the contrast was of very much less importance; and that from the psychological point of view, a certain amount of variation between the maximum and minimum was desirable to relieve monotony. As to the lighting-up of monuments, he thought London might be brightened up a good deal. There were monuments which could be seen to advantage; there were some not worth troubling about. Certain of the public buildings, too, might be illuminated by some system of lighting such as was adopted largely in America.

Mr. Hunter Boyd advocated the suppression of glare. He also suggested spot lighting of small diameter for kerbs. In considering street lighting, one should also keep in view not only the characteristics of the street, and the needs of the traffic, but the needs of the surface. Where there was wood surface, one got great bumps; and in the case of asphalte surfaces, with the present traffic, one got a large amount of reflection from the road surfaces, which became very trying. No direct illumination should fall upon the eye at an angle anything less than 45°, which would mean putting the lamps rather high, and rather close together. Another thing exemplified during the war was the advantage of keeping a steady light. The glare effect of centre lighting for a man sitting high on a railway lorry gave much trouble.

Mr. H. A. Carter referred to the economizing value of good reflecting surfaces on buildings. He had been associated with the lighting of some large ordnance depôts in the country. The first portion of the sheds put up were of corrugated iron; and they used lanterns and 500-watt lamps. An extension was made of the buildings in reinforced concrete; and using the same type lanterns and the same spacing, they were able to reduce the lamps to 300 watt ones—a saving of 40 p ct. in energy.

Mr. J. N. Stephens suggested that they ought to get rid of the ornamental standard idea and the mass of metal entailed, and aim at getting something more flexible.

Mr. Goodenough pointed out that they were not absolutely bound by the existing lamp columns in London. When the City of Westminster improved their street lighting about ten years ago, the Council put up a lot of new columns at different heights according to the importance of the streets. They also rearranged a great many of the existing street columns. When they got a really progressive authority like the Westminster City Council, they did not allow themselves to be bound by the conditions that existed; but they showed a great deal of enterprise. The same could be said of the Corporation of the City of London. He proposed that the best thanks of the members be given to Mr. Gaster for his introduction to the discussion.

Prof. W. C. Clinton seconded the motion.

Mr. Gaster, in his reply, agreed that it was not desirable to have perfectly uniform illumination. Touching the question of maximum and minimum illumination, he remarked that a certain amount of light was tolerable and easy for the eye to look at, but anything beyond caused strain; so that he disagreed with the view that it did not much matter what the maximum was, provided the minimum was sufficiently high. If one started from a low illumination and walked towards a very powerful source of light, and that source was not screened, but the light was absolutely direct, the eye would be affected. Time was necessary to give the eye a chance to adapt itself.

COAL, ITS WASTE, AND POSSIBILITIES.

Yesterday afternoon there was a private view of a film entitled "Coal, its Waste, and Possibilities." It was produced by the Gaumont Company, under the direction of the Fuel Department of the Automobile Association, to show how wasteful is the practice of using coal in its raw condition for any purpose—whether for power, heating, or domestic use.

The film starts by showing a pit-head winding gear and wagons full of coal. As an example of the waste in open grates, a woman is shown making up a roaring fire, losing in this wasteful manner 70 p.ct. of the heat in the coal; afterwards is shown a hand-fired boiler in process of being stoked. Here the waste is up to 48 p.ct. Following on these pictures is that of a chimney belching forth volumes of smoke, the smoke containing all the valuable bye-products which are utterly lost. The smoke only causes infinite disturbance to the public by forming the fogs with which all manufacturing districts are familiar.

Then follows a statement as to what can be obtained from a ton of coal scientifically treated; and the way the products are obtained is dealt with. After all the bye-products have been extracted, the coke is shown being pushed out in a red-hot condition and quenched with water.

Having illustrated a few of the more important uses to which coke can be put, the question of the 2½ gallons of benzol recovered from each ton of coal is shown by pictures—beginning with a meat lorry, capable of carrying enough meat to last 1800 people for a week; buses carrying scores of workers from their offices to their homes; an ordinary touring pleasure car; and lastly, a first-aid Automobile Association side-car. It is explained that 2½ gallons of benzol, or the product of only one ton of coal scientifically treated, is enough to drive the lorry twenty miles, the car forty miles, and the side-car one hundred and fifty miles.

The film ends with an appeal to all to encourage the use and production of our principal home-grown motor fuel—benzol.

The Political Responsibility of Engineers.—In a paper submitted to the American Association of Engineers, Mr. W. A. Stinchcomb, Engineer for Cuyahoga County (Ohio), remarked: "Shall anyone say that the engineer's training and experience do not better fit him to solve the problem of government as our civilization becomes more complex, than one trained in any of the other great professions? In our cities practically all our problems are subject to scientific analysis. . . . On questions affecting the control of public utilities—such as transportation, electric or gas supply, and telephone service—the engineer's training best fits him to bargain with the trained mind representing the public utilities, and to know that when the contract has been made justice has been done both to the public and the service corporation. As cities extend farther into the realm of municipal ownership of these public utilities, his obligations to serve the public in an executive capacity in directing the management of such work increases, and his fitness to serve grows."

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CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Control of Sulphate of Ammonia Sales.

SIR,—From communications which have reached me, it would not appear that belief in the satisfaction of the producers of sulphate of ammonia with the action of the Association in the matter of control of sales is well-founded. Two years ago a meeting of makers passed the following resolution:

> "The meeting also considered the Export Equalization Scheme which was circulated on June 18, and while agreeing that the scheme should remain in force until Dec. 31, 1918, was strongly of opinion that steps should be taken to prevent the trade from drifting into a position of continued Government control after the war."

It is a great pity that the Association should, in the matter of the export of sulphate, lend itself to the continuance of that very control which it is every business person's desire to get abolished without delay.

CHARLES CARPENTER.

South Metropolitan Gas Company,
709, *Old Kent Road, S.E., June* 30, 1919.

Plymouth Gas Company's Meeting—A Correction.

SIR,—In your otherwise admirable report of the proceedings at the annual meeting of this Company, my Chairman is incorrectly represented as stating that "the shareholders' loss in decreased dividends was no less than £157,000." This figure represents the depreciation during the war in the market value of the capital of the Company.

GEO. H. BOLTON, Secretary.

Plymouth and Stonehouse Gas Light and Coke Company, June 25, 1919.

REGISTER OF PATENTS.

Gas-Burning Apparatus.—No. 126,761.

DAVIS, J. E., of Ironton, Ohio, U.S.A.
No. 4340; March 12, 1918.

This invention relates to apparatus for burning gaseous fuel, and is especially adapted to consume natural gas. To this end, one feature of the invention resides in providing a plurality of gas and air mixing tubes in association with a specially constructed heat-deflecting structure which will enable natural gas to be practically used as a fuel. The heat-deflecting structure is so made as to render it especially adaptable for use in connection with the particular construction of burner described, whereby there is produced a combined gas-burner and heat-deflecting structure which may be readily applied to any conventional type of furnace by applying it to the fire-box of the furnace through the door leading into it.

Pilots for Gas-Burners.—No. 126,788.

DILUCHIO, M. M., of Wilmington, Delaware, U.S.A.
No. 8091; May 14, 1918.

This incandescent burner pilot light extends into the interior of the mantle, which construction, it is claimed, will prevent the breaking of the mantle when the burner is ignited.

The burner-head is provided with a nipple having a bye-pass passage—the nipple forming an integral part of the burner-head, and projecting to the interior of the mantle, so that, when lighting the burner, the gas will be ignited from the interior of the mantle instead of the exterior as is customary, which obviates the danger of breaking the mantle, as the explosion of the gas outside the mantle when becoming ignited will often break it.

Dust-Arresting Means for Water-Gas Plant. No. 127,179.

DEMPSTER, R. & J., LTD., and BALLINGALL, J. M., of Manchester.
No. 16,711; Oct. 14, 1918.

The arresting means referred to is a modification of that described in patent No. 116,876, in which the whole of the gases have to pass through a screen of falling water before escaping into the open air. The arrester then described was to be fixed at the upper part of the chimney, whereas according to the present invention it is so situated relatively to the plant as to be capable of use in a dual manner—that is to say, when the generator is "blowing" the resulting gases are capable of being passed through the arrester for the abstraction of dust, cinders, and the like before being passed into the chimney; and, also, when the process of water-gas manufacture by the introduction of steam into the generator is taking place, the resulting gas is capable of passing through the arrester, and thereby is "largely cleared of impurities of a solid nature, as well as being washed by the screen of falling water, before passing to the scrubber or like apparatus." The arrester to be described is "adapted to allow of this dual function being performed, and is also modified to conform to the conditions thus brought about."

Fig. 1 is a sectional elevation of an arrester and the major portion of a water-gas plant, and fig. 2 is a part plan view.

A is the generator; B, a scrubber; and C, the lower portion of the chimney passage. D is the arrester provided with a hood E, a water

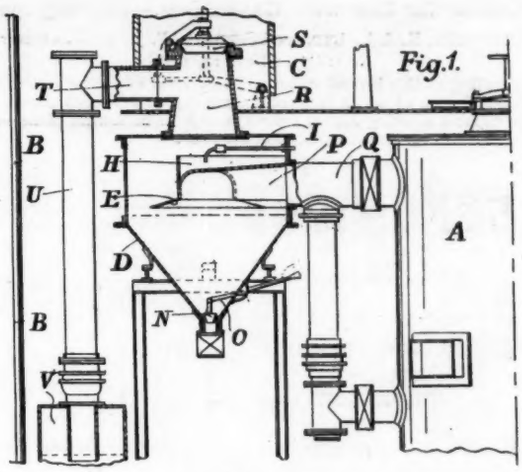


Fig. 1.

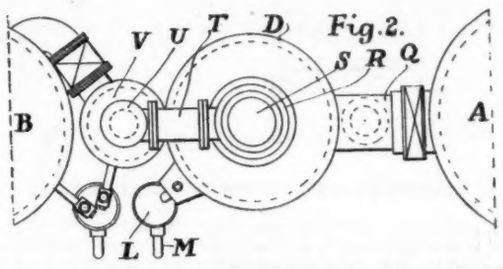


Fig. 2.

Ballingall's (R. & J. Dempster) Water-Gas Plant Dust Arrester.

container H, and a water supply pipe I. The water from the container flows down the outer surface of the hood and forms a screen when falling therefrom into the arrester below. Water is contained within the lower part of the arrester, to the level indicated by the broken line below the hood.

The hood is provided with an inlet passage P in communication with a pipe Q from the generator; and the arrester is also provided with an opening above the hood leading into a valve chamber R, having a bonnet or suitable valve S working in a seating. This valve is under the control of a hand lever through mechanism of a toggle-joint type to enable it to be lifted with ease, and without considerable motion. The valve chamber is also in free communication, through a pipe T, with a pipe U provided with a liquid seal at its lower end in a chamber V. In fig. 2 the ordinary pipe connections between the chamber V and the scrubber B are indicated.

In operation, during the blowing process, the resulting blow gases are cleared by being allowed to pass through pipes Q and P, and under the hood E—their escape being accomplished by passing through the screen of falling water at the edge portions of the hood, when they pass into the chamber R. The valve S being open at the time, the blow gases enter the chimney C for final escape into the open air. The liquid seal at the chamber V prevents the blow gases entering the scrubber.

After the short period required for this blowing process is ended, the valve S is closed; and as the water gas is manufactured, it is allowed to pass through the arrester, so as to be cleared of dust and the like, as well as to be washed, by the falling water; but on entering the chamber R, it is diverted into the pipe system T and U, and forces its way through the seal at V on its way to the scrubber.

As the arrester deals with the blow gases before they are mixed with the air outside, there is comparatively a small volume of these gases to be operated upon by the arrester; and "this concentrated condition of the gases enables the dust to be very effectively abstracted." Also, the abstraction of dust from the water gas, before it passes to the seal at V, is said to enable the latter to be kept clear of obstruction for a longer period than usual—thus reducing the frequency with which it requires to be cleaned.

Purification of Coal Gas.—No. 127,431.

ADAM, W. G., of Park Row, Knightsbridge, S.W.
No. 10,287; June 21, 1918.

This invention has for its object the removal from coal gas of naphthalene and any sulphur compounds contained therein.

The gas (preferably after having been passed through the usual purifiers and scrubbers) is passed through animal or wood charcoal, preferably in a granulated condition. If it is desired that ethylene and other hydrocarbons should remain in the gas, the quantity of charcoal used is limited—the quantity depending on the amount of naphthalene and sulphur compounds in the gas and on the activity of the charcoal.

As an example, if it is desired to purify 12,000 c.ft. of gas containing 35 grains of sulphur per 100 c.ft. and 6 grains of naphthalene per 100 c.ft., the quantity of charcoal required would be about 70 lbs. In actually carrying out an experiment, it was found that the naphthalene was entirely removed, while the amount of sulphur was reduced to 7 grains per 100 c.ft.

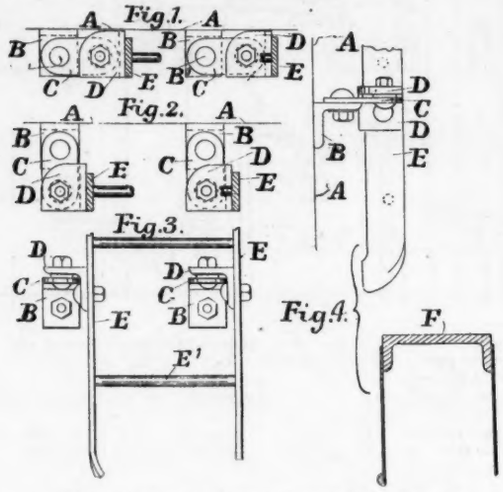
The naphthalene and sulphur compounds may be removed from the charcoal in an unchanged condition by the application of heat—a temperature of about 300° C. being sufficient. The charcoal, after the heat treatment, is cooled and returned to the system, and "can thus be used repeatedly for the absorption of the impurities."

Ladder for Use with Gasholders.—No. 127,190.

DEMPSTER, R. & J., LTD., and SIDDALL, F. J., of Manchester.

No. 18,941; Nov. 19, 1918.

According to this invention, an ordinary form of ladder is arranged in lengths, each of which is pivoted upon supports in such manner as to be capable of being moved sideways or in a horizontal plane—outwards for use, or inwards when not required.



Siddall's (R. & J. Dempster) Gasholder Ladders.

Fig. 1 is a plan (partly in section) of one form of the invention applied to a ladder when in the inward position or comparatively close to the holder. Fig. 2 is a similar view when the ladder length is in the outward position (ready for use). Fig. 3 is a front elevation of fig. 2. Fig. 4 is a side view of fig. 3 showing the dip portion of an adjacent lift previous to the descent of the part of the holder to which the ladder is attached.

A is the sheeting of a holder, to which the ladder is connected. B are brackets connected to the sheeting, and to which are pivoted links C. To these links are also pivoted bracket-pieces D rigidly connected to the side E.

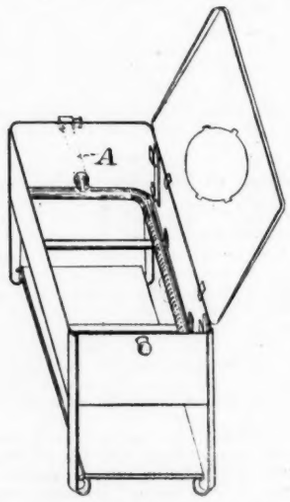
It will be seen that the ladder length is capable of being moved (upon pivots) in a horizontal manner, so that its weight is supported at the pivots—thus rendering it an easy matter for a workman on a ladder length below to pull outwards the length above him. Each lift may have its own series of ladder lengths, since, on reaching the top of one lift, the operator may step across the top of the dip of the lift named to the ladder arranged up the side of the next lift. The top of the dip of an adjacent lift is indicated at F in fig. 4. This dip portion is assumed to be capable by contact of moving the ladder E as the lift carrying it descends. In the case of a spirally-guided holder, the lower end of the ladder may be so shaped that the dip impinging against it will have the effect of forcing the ladder sideways about its pivots.

Gas Cooking and Heating Stove.—No. 127,538.

HERSEY, M. H., of Henrietta Street, Covent Garden, W.C.

No. 2520; Jan. 31, 1919.

This invention comprises an arrangement within a casing of a series of flame jets emerging from vertical slits combined with a movable deflector which can either be placed in close relation to the flames to deflect the heat downwards or raised to a position clear of them.



Hersey's Gas-Stove.

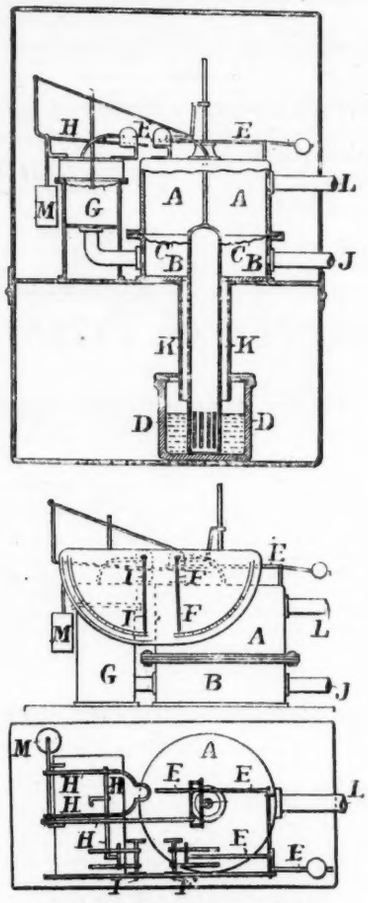
A perspective view of the stove (with the lid turned back) is shown. The casing is provided with a main gas-pipe A fitted with a bunsen burner, and branching into side pipes just within the stove chamber) supported by the cross bars. The side pipes are provided with a series of gas-jet openings B in the form of transverse slots, and not of the usual circular formation. Brackets attached to the sides of the casing above the gas-pipes form supports for deflectors of the heat downwards or placed on the upper arms of the brackets clear of the gas-jets, so as to allow the heat to rise to the top of the stove. The deflectors comprise three metal strips connected by bolts and adapted to clip asbestos cotton. When in position the deflector is so placed that the asbestos lies against the flame jets and deflects them downwards toward the bottom plate.

Indicating the Flow and Pressure of Gas. No. 127,387.

BELL, L., of Edinburgh.

No. 8679; May 25, 1918.

This apparatus is intended for automatically indicating the flow and pressure of gas through a pipe or passage, so that the quantity flowing and pressure can be instantly indicated.



Bell's Flow and Pressure Indicator.

The illustrations show a vertical section, an elevation (with the upper part of the casing removed), and a plan.

In the example shown, the apparatus consists of a chamber divided into two horizontal compartments A B by a horizontal flexible diaphragm C, to which is connected the upper end of an open tube, provided with a number of longitudinal slits near its lower end. When no gas is flowing, the lower end of the tube is immersed so that the slits are below the level of a sealing agent (such as mercury) contained in a receptacle D, connected to the compartment B by a tube of larger diameter than the first mentioned tube, and concentric thereto, so that an annular passage is formed between the tubes, for a purpose hereafter referred to. To the upper end of the main tube is fixed one end of a rod projecting through a stuffing box, or liquid seal, in the top of the chamber. To the rod is hinged a depending frame, the lower end of which rests (and slides) on a lever E, in turn operating an indicator pointer F, adapted to travel over the face of a graduated dial, whereby the flow is indicated.

Attached to, and communicating with, the compartment B is a small chamber G, closed at its upper end by a flexible diaphragm, so that the inner side of the diaphragm is exposed to the gas pressure, while its outer side is under atmospheric pressure. To the diaphragm is connected a rod, which, in turn, is connected to a lever which operates a needle or pointer I, so as to indicate the pressure of the gas H; while the depending frame already referred to is connected by a rod to, and operated by, the lever H. When the pressure is normal, the frame merely rises and falls with the central rod; but on the pressure increasing, the lever H is tilted and draws the lower edge of the frame along the lever E, thus allowing it a greater radius of action, and also allowing an increased movement of the pointer F, so as to correspond with the increased pressure.

In operation, the action is as follows: An inlet port J is formed in the compartment B, through which the gas enters, with the result that the diaphragm and its tube are raised, so that the slits in the lower end of the tube are more or less uncovered, depending on the pressure of the gas. The gas now escapes from the lower compartment down through the annular passage K, in through the uncovered portion of the slits, and up through the central tube to the top compartment A, and escapes by an outlet port L. When the gas reaches the upper compartment, it immediately exerts a pressure on the opposite side of the diaphragm, which floats, keeping the slits at the bottom of the tube just sufficiently uncovered to allow the amount of gas to pass which corresponds to the uncovered area of the slits. The various flows of gas, at various pressures, is determined, and therefore immediately the gas enters the chamber G. its diaphragm is raised, and the pointer I indicates the pressure, and at the same time fixes the position of the hinged depending frame relative to the flow indicator lever E—that is to say, the lower end of the frame which rests on the lever is caused to slide either away from, or towards, the fulcrum of the latter, accordingly as the pressure rises or falls.

Suspended from one of the pressure indicator levers, and fixed rigidly to it, is an adjustable pendulum weight. When no pressure is indicated, the pendulum hangs vertical; but immediately pressure is exerted, the pendulum and weight are inclined to an extent varying with the pressure. The weight serves a double purpose—it acts as a load on the pressure indicator and always brings the pointer I back to zero when the pressure is removed, and, secondly, as the pendulum is provided with a predetermined graduated scale, by raising or lowering the weight the apparatus can be adjusted to suit any specific gravity of gas.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

It was reported by the Examiners that the further Standing Orders applicable to the Stocksbridge Gas Bill had been complied with; and that the Standing Orders had not been complied with in respect of the petition for additional provision in the Pembroke Gas Bill and in respect of the petition for the Ammanford Gas Bill.

The Stockton-on-Tees Corporation Bill was read the third time, passed, and sent to the Commons.

HOUSE OF COMMONS.

Progress of Bills.

The Newark Gas Bill and the Sheringham Gas and Water Bill were read a second time, and committed.

The report of the Eaminers that, in the case of the Ammanford Gas Bill and additional provision in the Pembroke Gas Bill, the Standing Orders had not been complied with, was referred to the Select Committee on Standing Orders.

The Hartlepool Gas and Water Bill was reported, with amendments.

The Sunderland Corporation have withdrawn their petition against the Sunderland Gas Bill.

The Stockton-on-Tees Corporation Bill was read the first time, and referred to the Examiners.

Home Oil Boring Developments.

Mr. KELLAWAY (the Deputy-Minister of Munitions), in the course of his statement to the House last week on the work of the Ministry of Munitions, referred to the home boring for oil. He said that the development at Hardstoft had gone on satisfactorily. The flow had reached the rate of eleven barrels a day, or 400 gallons. He desired to repeat the statement which he made to the House when he referred to this question previously—namely, that it was much too early yet to say whether they had really found an extensive oil field or not, but sufficient had been found to justify the experiment on which the Government embarked.

Port Glasgow Gas-Works Extensions.—The Gas Engineer at Port Glasgow (Mr. R. W. Cowie) has prepared plans, and the Town Council are closing the contract, for the laying of concrete foundations for the holder tank at the new gas-works, Fyfe Park. The Glover-West vertical retorts will cost £30,000, and the holder £21,000. Other outlays will represent nearly £30,000.

Malta and Mediterranean Gas Company, Ltd.—At the annual meeting next Tuesday, the Directors will report with much regret that the working for the year ended March 31 has resulted in a loss; and consequently no final dividends can be paid on either the preference or the ordinary shares. An interim dividend on the three classes of shares, amounting to £3227, was paid in December last. The usual debenture interest has also been paid. To meet these payments, the Directors propose to transfer from the reserve account the sum of £3369. There is a claim against the Italian Government (as ascertained to the present, £8193) for losses sustained in carrying on the works at Trapani and Marsala during the war, in accordance with instructions from the Italian Government, who agreed, under the Pareggio, to compensate the Company for any loss, when the accounts have been agreed by their Finance Department. The Directors are assured that a settlement will be made. The Government of Malta having deferred, until Dec. 19, 1917, giving their assent to the Company's proposal to advance the price of gas on Sept. 1, 1917, a loss of £2339 in revenue has been incurred by their action; and a memorial on this subject has been addressed to the Colonial Office.

MISCELLANEOUS NEWS.

SOUTH AFRICAN LIGHTING ASSOCIATION.

Good Progress and Dividends—The Economy of Local Coal.

The Ordinary General Meeting of the Association was held last Wednesday, at the London Offices, No. 90, Cannon Street, E.C.,—The Right Hon. Sir Daniel F. Goddard in the chair.

The SECRETARY (Mr. William Cash, F.C.A.) read the notice calling the meeting; and the report of the Directors and the statement of accounts were taken as read.

The CHAIRMAN, in moving their adoption, said he thought the shareholders had reason to congratulate themselves upon the result of the working of the past year. The business had grown. For many years, it would be remembered, they seemed to be going down and down; and the consumption was being reduced. They had now, he was glad to say, made a start in the other direction, and were rapidly pulling up. In 1912, the consumption of gas was 60,334,000 c.ft.; in 1916, it was down to 55,571,000 c.ft. Since then they had been climbing up; and last year they reached 67,421,000 c.ft., which was the highest figure to which they had attained during the war. This had been due to the growth of the business in Port Elizabeth. A good many local industries were springing up there. The difficulty of obtaining supplies from home on account of transport had obliged the people to set to work, and to produce for themselves. The result was that many little industries had been commenced, which were consuming gas; and this had helped the business of the Association. The gas sold at Port Elizabeth had increased by 14·5 p.ct. over the previous year, which was quite a good advance. The output at Grahamstown had also increased. He was sorry to say they had not got the full benefit of the increase, because for some reason (which was a little mysterious) the unaccounted-for gas had again risen. It would be within the recollection of the shareholders that they had before to fight most strenuously against the unaccounted-for gas. The increase of the unaccounted-for gas was then attributed to the meters; and steps were taken as far as possible to remedy it. Mr. Donaldson was going into the matter very carefully; and he seemed to think the meters were still at fault. He was making an examination of the meters with the view to rectifying the trouble; and he (the Chairman) hoped that during the year their Manager would succeed in getting over some of the difficulty. He reported that it was not due to defective mains. He could not find any great leakage in them. One of the holders, however, was becoming rather pitted; and there was some slight leakage from it. The increase in the sales of gas, of course, was partly accounted for by the advance in the number of consumers, which went up by 154 last year. The number would have been greater had it not been for one fact, which was a factor that bore on all gas undertakings—that was, that they could not get new meters, especially of the prepayment description, of which they required a good many. They hoped this would rectify itself presently, as things settled down after the war. But it was rather a pity when they would like to increase the sales of gas, and people were willing to take the gas, they were not able to supply them, because they were not in a position to furnish the meters that were wanted. The make of gas per ton of coal was not quite so good as it had been. It worked out to under 10,000 c.ft. per ton; but he thought this was to be attributed to the quality of the coal. They were now using only Colonial coal, and no English coal. For what reason he did not exactly know, but the coal had not been of the same quality as it was when they first took the Colonial material. They had called the attention of the collieries to this; and the last few letters they had had from South Africa gave them the news that the coal had somewhat improved. It was hoped that in this respect there would be still further improvement. As to the price of gas, it would be remembered that they reduced it at Port Elizabeth by 5d. per 1000 c.ft. The whole of last year had the benefit of this reduction; and there was no doubt the increase of consumption was partly due to it. As from Jan. 1, there was a further reduction of 5d. at Port Elizabeth. This year they were lowering the price at Grahamstown by 10d. from July 1. He thought they might claim some credit for this, because this was the third successive year in which on July 1 they had been able to reduce the price of gas by 10d. So the price was going down as it should do, and as, under their agreement, it ought to do. However, while the Association was doing better, they were giving the consumers the benefit of it. There was not much in the report that called for special attention. There was one thing that was not mentioned in the report, but the shareholders would have seen it in the accounts. That was the Directors had written-down the reserve investments. He believed the opinion was expressed at a former meeting by a shareholder that this should be done; and the Board thought it a wise thing to do. They had therefore written-down their investments to the market price on Dec. 31 last; and this had cost them £1100 to do. The profits for the year were enough to distribute the full dividend; and so they were proposing to pay 10 p.ct. They paid the same last year, and that was an increase. In 1914, at the beginning of the war, they were paying only 8 p.ct.; now they were paying 10 p.ct. Therefore he felt he might say the results were very satisfactory, especially seeing that, after paying 10 p.ct., they were able to carry forward £6098. He had the Manager's report which was full of details; and if there were any points the shareholders would like to inquire about, he should be pleased to inform them regarding them.

Mr. HENRY WOODALL said he did not think he had ever risen with more pleasure in his life, certainly not with more confidence, than he did that day to second the resolution. The aspect of affairs out in South Africa was refreshing to a degree. It had just occurred to him how the seasons as between this country and South Africa were exactly opposite, or nearly so, and so their financial aspects corresponded. Here when it was winter, it was summer there; and here the "winter of our discontent" was made "glorious summer" when they contemplated the different conditions in Africa. Here they were piling

up losses; and there was scarcely a concern in Britain which was able to carry on and pay the same dividend as before. Out in South Africa all was golden; and if the shareholders looked into the balance-sheet, they would find the conditions were much better than they would appear to be from casual observation. They would find that they had there assets of a realizable character equal to 30 p.ct. of the whole subscribed capital. He did not know where they would find another concern that would bear such a searching investigation.

Mr. H. WOODALL (Sir Corbet Woodall & Son, Consulting Engineers), invited by the Chairman to speak, said he felt all present realized that they had been very well served by their officials in South Africa. Although Mr. Henry Woodall thought everything was golden out there, the officials of the Association had had their troubles. There had been certain troubles with labour; but not so serious as here. With regard to coal, the Chairman mentioned a little difficulty they had had. There they were in much the same position as here. The collieries had not had all the labour they wanted; and they had not been washing the coal so well as in the early days. They had, however, informed them that they would soon be sending in cleaner coal. As the shareholders knew, the carbonizing of dirt did not produce gas. Speaking generally, the position in South Africa was very good; and their officials served them extremely well. The Directors had recognized the services of their officers; and everything was favourable at the present time.

Mr. F. R. SMITH congratulated the Board upon their very satisfactory report. It was, as Mr. Henry Woodall had said, refreshing to find a company reducing the price of gas when everything was on the up-grade in this country. In regard to the Chairman's remarks as to meters, it must be very trying when companies had orders for meters if they could not be supplied. But he should like to point out that the difficulty had not been entirely with the meter makers. The Government put an absolute restriction upon the export of meters; and therefore it had from that point of view alone been impossible to supply them. But they might be assured the supply would now be kept up.

The CHAIRMAN remarked that he had omitted to say anything in his address regarding the secondary products. Colonial coal did not produce so much tar for instance as English coal; but in the price they found compensation for the shortage in the quantity of the by-products. Really, therefore, they were not suffering at all from this point of view.

The motion was unanimously carried.

Moved by the CHAIRMAN, and seconded by Mr. JAMES MACALISTER, a dividend at the rate of 10 p.ct. per annum (less the interim payment of 4 p.ct.), subject to income-tax, was declared.

On the proposition of the CHAIRMAN, seconded by Mr. HENRY WOODALL, Mr. A. L. Don was re-elected to his seat at the Board.

On the motion of Mr. F. R. SMITH, seconded by Mr. A. J. KINGDON, the Auditor (Mr. P. D. Griffiths, F.C.A.) was re-appointed.

The CHAIRMAN said he was sure it would give their officials the fullest satisfaction if the shareholders recorded approval of their work. They were well served in their engineering department. Mr. Woodall (their Consulting Engineer) gave close attention to the business; and he was in constant correspondence with the Manager in South Africa. He saw that the plant and apparatus were kept in proper order. Then they could not, if they searched London through, find a better man as Secretary than Mr. Cash. His knowledge of gas undertakings was great. He had experience as a Director of gas companies, and was Chairman of an important one. This made him an invaluable servant. Mr. Donaldson, their Manager at Port Elizabeth, had not been very long with them; but he had proved himself a most efficient Manager. They had a feeling that part of his success was due to the care he took in meeting the complaints of consumers, and keeping in personal touch with them. He also managed the works well; and the Board felt satisfied that he had been chosen for the office he now held. At Grahamstown, Mr. Hart was also doing exceedingly well. Mr. Sterley was their very able local Secretary. These and all their employees the Board felt had done their work well. Their services had been acknowledged by giving them increases in their salaries; and there would be appreciation of a resolution from the meeting recording the satisfaction of the shareholders with these services.

Mr. H. S. WHILE seconded the motion, which was heartily passed.

Mr. CASH thanked the Chairman for his kind remarks concerning all the officials, and the shareholders for their warm endorsement. Their officers and other employees in South Africa did very much appreciate such recognition by the shareholders. They had heavy responsibilities; and they had their difficulties. It was a great assistance to both the Board and the officers on the other side to have the advice of Messrs. Corbet Woodall & Son in directing the technical part of the business.

Moved by Mr. SMITH, and seconded by Mr. KINGDON, a cordial vote of thanks was also passed to the Chairman and Directors.

GAS STRIKE AT HASTINGS.

Company Urged to Break Faith with Ex-Service Men.

Towards the end of last week, the Hastings and St. Leonards Gas Company found themselves in the midst of the second strike that has occurred within a period of less than ten months. The day Union men came out on Thursday night, and the night men on Friday morning.

The facts, as stated in the local "Observer," are that on September 14 last the men ceased work because the Directors, who had assented to the men's request that a claim for an increased bonus should go to arbitration, refused to accede to a fresh request that the Directors should pay such claim before and without arbitration. The men, after being out four days, returned to work on the old lines, without any concession gained, but having lost wages.

In February last, two letters were received from the Union men calling on the Directors to either compel two ex-service men to join the Union or to dismiss them. This the Directors refused to do, because their principle had always been to leave their men to join or not as they liked—it being in the Directors' opinion a question, like politics, entirely for the men's own decision. Furthermore, the Directors had pledged their word to men who had joined the Colours, of whom these were two, that on their return they should be taken on again, in accordance with which pledge they had been re-employed. To impose any such fresh condition, or to discharge them, would not have been an honest performance of the pledge.

After a lengthy conference between the Union's Organizer and the Chairman and the Engineer (Mr. C. F. Botley), the men's notices were withdrawn, at the last moment, without any condition; and it was inferred that the question was at rest. But on May 8 the Directors were asked to re-open the matter, and that their representative should meet Mr. A. Hayday, M.P., thereon. The Directors emphatically refused to re-open the question, as the principles involved were such that they could not be departed from. Nothing more was heard; and again it was thought that the subject had been dropped, till by a letter of June 19 it was made one of three demands that these ex-service men should be compelled to join the Union or be dismissed. As the Directors had repeatedly declined to do so, because they could not go back on their word, and were not prepared to alter their principle of non-interference, there was only one course open to them—namely, to decline to consider any demands of which such compulsion or dismissal was one.

This was the whole question in dispute, to which two other demands had been tacked, one for a 48-hour week and eight-hour shifts, which had already been conceded, and were being put into operation as soon as practicable. The other point, for a further increase of war bonus, could have been soon settled by arbitration; but this had neither been asked nor suggested. The men are already receiving a war bonus of from 22s. to 25s. *plus* 12½ p.ct. on total earnings; the Company paying a total wage of from 47s. 3d. to 72s. according to class—more than is paid for similar work by either the Corporation or private employers. Also there has been no rise in food prices since the last increase of pay; but, on the contrary, there has been a fall of 25 p.ct. in May, and a further 4 p.ct. since then.

STOKE-ON-TRENT CORPORATION GAS UNDERTAKING.

Large Scheme for Centralization of Manufacture.—Proposed Purchase of the British Gas Light Company's Etruria Works.

Important schemes were submitted at a meeting of the Stoke-on-Trent County Borough Council last Thursday, when the Gas Committee reported that they had considered the special reports of the Engineer (Mr. A. M'Kay) with reference to the gas undertakings of the borough, in which three schemes for dealing with the matter were suggested by him—

(1) The establishment of a central works to supply the whole of the district.

(2) The linking-up of the Stoke, Fenton, and Longton supply at one point.

(3) The manufacture of gas for the Fenton and Stoke areas at the Fenton works.

The Committee had resolved that scheme No. 3 be eliminated; and at a subsequent special meeting held for the purpose of further considering the matter, the Committee resolved that, in their opinion, after fully considering the reports of the Engineer, the time had arrived when a central works for the supply of the whole area should be established, and that the Council be recommended to adopt the scheme submitted by the Engineer, including the acquisition of the local gas undertaking of the British Gas Light Company, Ltd.

Alderman T. MITCHELL (the Chairman of the Committee), referring to this matter, remarked that shortly after the present Engineer's appointment, he presented reports on the buildings, plant, and financial position of the whole of the four gas undertakings of the Corporation; and as an outcome of these reports, the Committee, after very many meetings, put forward the resolution contained in that day's report. He had no doubt most of the members of the Town Council would recognize that, with the present scattered conditions of the gas undertaking, the management was made somewhat difficult, and that management and working expenses were heavier than need be. To put the whole area into a satisfactory position, it was necessary for the Corporation to acquire the Potteries Branch of the British Gas Light Company. To a casual observer, it would seem a mistake that the whole of the Potteries area should be supplied from the Corporation works with the exception of Hanley and Tunstall; and why this should be so was difficult to explain. But the Committee were fully convinced that, by acquiring this undertaking and re-erecting suitable plant at one central works, the distribution of gas to the whole of the Potteries area would be more satisfactory and economical than at present. In acquiring this undertaking, the Committee were conscious that it would be necessary for the shareholders to have a fair return for their money; and, having regard to this, and incidental expenses incurred, the Committee were of opinion that the Corporation would be able to sell gas as cheaply as, if not cheaper than, at the present time. He hoped the Council would recognize that the present works of the Corporation required considerable sums of money spent on them, and would allow the minute to pass as it stood, because the Committee were anxious that no unnecessary expenses should be put upon the works, but that the larger scheme should be begun at the very earliest moment.

After a lengthy discussion, it was agreed that the consideration of the scheme be deferred to a special meeting of the Town Council.

THE FINANCIAL STATEMENT.

In presenting the accounts of the gas undertaking for the year ending March 31, Alderman Mitchell said they had passed through a period of abnormal difficulty; but it had been attended by conspicuous success. There had been trying times to be contended with during the past

year; but the Committee had done their best under very difficult conditions. Coal troubles had been again specially serious; while labour shortage had had to be contended with throughout the period. At Christmas-time it was necessary, in order to ensure the supply of gas, for a quantity of coal to be taken from the Durham district. This coal cost the Committee a considerable sum more than that paid to the local collieries, and was much inferior. The Committee had, of course, made vigorous protests against having to carry this inferior coal so far, and especially into a district where more suitable material was available. There was, however, not much hope of the position improving until the Coal Controller's powers were taken away, and they were allowed to get their supplies from the best and most convenient sources. The accounts, they would agree, were very satisfactory, showing credit balances at three works, and the figures at the other practically squaring themselves. The total net credit balance for the four works together was £4137. There had been highly satisfactory working results at all the stations—in every case showing an increased make of gas per ton of coal. The increased gas sold during the year totalled almost 9 million c.ft. The Committee, in the meantime, did not propose increasing the price of gas, though they wished to state that, should the threatened increase of 4s. 6d. be added to the price of coal, it would be necessary to reconsider the selling price of gas.

DEVIZES GAS-WORKS EXTENSIONS.

Recommendations based upon reports prepared by Mr. W. Doig Gibb and Mr. W. J. Rendell Baker (the Engineer and Manager) were submitted by the Gas Committee at a meeting on the 20th ult. of the Devizes Corporation.

An indication of the work which was suggested by Mr. Gibb and Mr. Baker was given on p. 818 of last week's "JOURNAL." The Committee recommended the carrying out of certain extensions and improvements estimated to require a total expenditure of between £15,000 and £16,000. Some of this work is to be paid for out of the reserve fund; and to meet the outlay on the other portion (about £11,000), the Council gave the Committee authority to apply to the Local Government Board to borrow a sum not exceeding £14,000. One of the original recommendations was to erect a new holder of 250,000 c.ft. capacity; but, while fully realizing the necessity for this, the Committee decided not to proceed at present with the provision of a holder. In deciding upon this course, the Committee are prepared to share such contingent risks with Mr. Baker as might be involved by any failure in the supply consequent upon the omission of this part of the scheme. The work to be put in hand includes the provision of a stoking machine, a sulphate of ammonia plant, a rotary scrubber, and other apparatus, and overhauling the water-gas apparatus. The cost of the complete scheme was estimated at £35,000; but the striking out of the gasholder will reduce the amount by about one-half.

The Committee's proposals were adopted by fourteen votes to four.

GAS-FIRES AND HOUSING SCHEMES.

In the Lecture Room of the National Union of Trained Nurses, Marsham Street, Westminster, last Friday week, Mr. William Lawton demonstrated a new invention for heating water in rooms and flats for domestic purposes; and Mr. H. H. Creasey lectured on "Heating and Ventilation in Relation to Rehousing."

Mr. Creasey's lecture was of a popular type, and dealt well with the salient points of his subject; but, as he himself said, it was impossible in half-an-hour to fully explain all the reasons why gas-fires should be extensively used for heating modern houses. He drew attention to the urgent need for the conservation of coal, and stated his reasons for being opposed to central heating; and then he dealt with the benefits of gas for heating and cooking in connection with housing schemes. His points in regard to economy and the advantages of gas installations in building are reproduced in his own words.

I may be asked what will the installation of gas-fires add to the cost of building the houses? The answer to this question is that, far from costing more, their installation will save materials and labour, provide more floor space and breathing space in the rooms, and will actually save about £30 per house in money. If I am right, as I propose to prove to you, see what it means to the nation—apart from all the other advantages, including convenience, saving of labour, lack of dust and dirt, hygiene, and far less smoke in our cities or their vicinity. I saw in the Public Press recently that the London County Council will be dealing with the building of 29,000 houses. If I am right, 29,000 × £30 means that £870,000 could be saved; and if 300,000 houses are thus dealt with, £9,000,000 could be saved.

I will explain how this can be done. Gas-fires do not need such large flues as coal-fires, because their products of combustion are lighter and of a more vaporous character, not being laden with smoke and soot. From the first day a coal-fire is lighted, its flue begins to soot-up and reduce in area. Hence the need for large flues, and the fairly frequent attention which has to be given by the chimney-sweep—another expensive adjunct attending the use of coal-fires. If a gas-fire is fitted to a clean flue, this will remain clean and of the same area for ever, and will never need sweeping. The large flues necessarily provided for the coal-fires need the construction of what are known as chimney-breasts and chimney-stacks, and other things technically called concrete hearths, skewback arches, trimmers, brick footings, and foundation concrete.

If gas-fires of what are known as the "interior," "built-in," or

Gas and the Housing Problem.

PENDING the necessary provision of new houses, the best has to be made of existing accommodation. The essential economy of space is secured by the use of the ideal Cookers in present circumstances — Main's "Kent," "Sussex" and "Surrey." These efficient and compact cookers embody all recent improvements and are designed with a view to securing the minimum cost for maintenance.

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SHOW-ROOMS AND BRANCHES: 25, Princes Street, Oxford Circus, W. 1; 82, Gordon Street, GLASGOW; 18, Severn Street, Deansgate, MANCHESTER; 97, Millfield, BELFAST; 333, Queen Street, MELBOURNE.

"complete gas-grate" type are fitted to tiled backs or some similar finish with plain wooden surrounds, when the houses are erected, no chimney-breasts whatever will be necessary in some cases; and, at the worst, only a slight local thickening of the wall will be needed behind the gas-fire. A plain flue or ventilating shaft, say, 12 in. by 3 in., or 9 in. by 4½ in., constructed in the thickness of the wall or in a cavity wall, is all that is necessary to carry away the products of combustion from the largest gas-fire ever likely to be fitted in the rooms under discussion, and to ventilate the rooms either in summer or winter.

A prominent architect (connected with a Garden City), who is continually experimenting in building construction, with a view to economizing in cost and materials, recently estimated that if the system mentioned were adopted 5000 bricks less per cottage would be used and £45 would be saved. After allowing for the purchase of quite artistic gas-fires instead of coal-grates, therefore, the saving of £30 per house I have just mentioned would be assured. This is not the only evidence I can put forward, however, as further definite proof has just been provided in the case of a small block of offices being erected in the City of London. It was the architect's original intention to build the usual coal-fires and chimney-breasts; but reconsidering the case in the light of such evidence as I have mentioned, and the suggestions contained in an article which appeared in the "Builder" of Sept. 24, 1915, entitled "War and After-War Economy," he decided to alter the plans and adopt gas-fires for heating. By their adoption, £180 will be saved in the cost of building, the total floor space will be increased by 96 sq. ft., and the cubic capacity of the building by nearly 5000 c.ft. These are not imaginary figures, as the building costs of the original and altered plans were worked out by a quantity surveyor, whose business it is to prepare bills of quantities, and who has absolutely no bias one way or another—simply working out his figures on the actual requirements of material, &c., for the building concerned.

Leading architects have expressed similar opinions, as regards economy in building, as those I have set out; and I submit, therefore, that I have fully made out a case for the installation of gas-fires in the Government housing schemes, from the view-point of the prospective occupiers, and, what is of even greater importance, in the interests of the community as a whole, as regards a very great monetary saving and conservation of that precious commodity coal.

Mr. H. S. Munnings has joined Messrs. A. G. Sutherland, Ltd., of Birmingham, and will in future act as their London Manager.

An order for a 200,000 c.ft. per day capacity Tully's carburetted hydrogen plant has been received by Messrs. Bale and Hardy, Ltd., from the Swadlincote Urban District Council.

The Directors of Gibbons (Dudley), Ltd., have declared interim dividends on the preference and ordinary shares of 7 p.c. per annum, free of income-tax, for the six months ended June 30, payable to-day (July 1).

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *June* 30.

In the London market the firm tone of pitch is well maintained; there being a considerable amount of inquiry. In other products there is nothing of special interest to record. Values generally are as follows: Pitch is firm at over 65s. per ton. Creosote, 5½d. to 6d. per gallon net and naked. Solvent naphtha, 95/160, 2s. 3d. to 2s. 4½d. per gallon. Anthracene, 7d. to 8d. per unit, casks free. Pure toluol, 2s. 9d. to 3s per gallon. Pyridine bases, 4s. to 4s. 3d. per gallon in buyers' drums.

In sulphate of ammonia, the position remains unchanged. Available supplies are being readily taken up.

Tar Products in the Provinces.

June 30.

The average values for gas-works products during the week were: Gas-works coal tar, 34s. 6d. to 39s. 6d. Pitch, East Coast, 56s. to 58s. 6d. per ton f.a.s.; West Coast—Manchester 48s. to 50s.; Liverpool, 48s. to 50s., Clyde, 55s. to 57s. 6d. nominal. Benzol 90 p.ct., North, 1s. 8d. to 1s. 10d.; crude, 65 p.ct., at 120° C., 11d. to 1s. naked at makers' works; 50-90 p.ct. naked, North, 1s. 8d. to 1s. 10d. Toluol, naked, North, 2s. to 2s. 1d. nominal. Coal tar crude naphtha in bulk, North, 7¾d. to 8¼d. Solvent naphtha, naked, North, 1s. 9d. to 1s. 11d. Heavy naphtha, North, 2s. 3d. to 2s. 5d. Creosote in bulk, North, liquid, 5d. to 5¼d.; salty, 4¾d. to 4¾d. Heavy oils, in bulk, North, 6d. to 6¼d. Carbolic acid, 60 p.ct., unsaleable. Naphthalene, £16 to £18; salts, £5 to £6, bags included. Anthracene "A" quality, 7¼d. to 7½d. per minimum 40 p.ct.; "B" quality, 2d. nominal.

Manchester District Tar Prices.

The average price realized for tar in the Manchester district, based on the value of the products, for the month of May was £2 7s. 11d. per ton.

FROM A MARKET CORRESPONDENT.

Tar Products.

Although there is no important change to be noted in last week's market, the general feeling is quiet. Pitch continues to be very firmly held. A fair volume of business is being done, and forward inquiries are distinctly promising. Higher quotations are confidently predicted, for which various reasons are given. It is thought, for instance, that the Continent will need plenty of pitch to keep up the supply of fuel,

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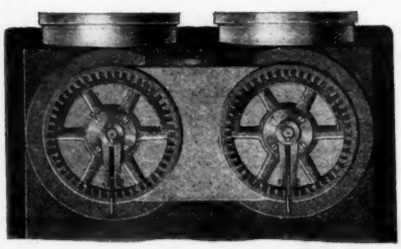

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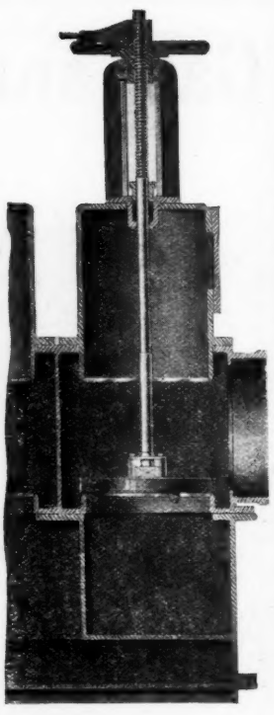

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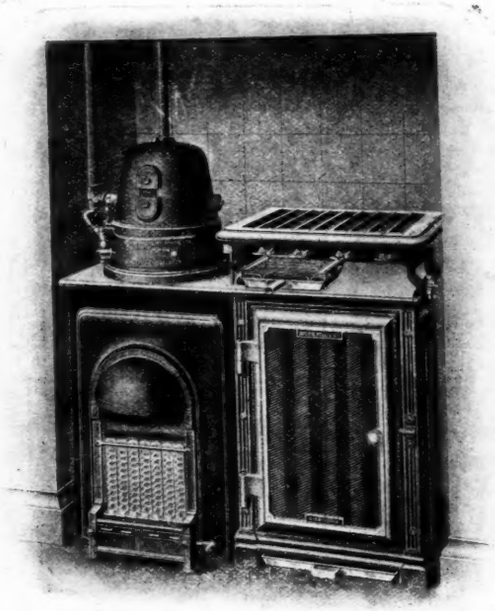

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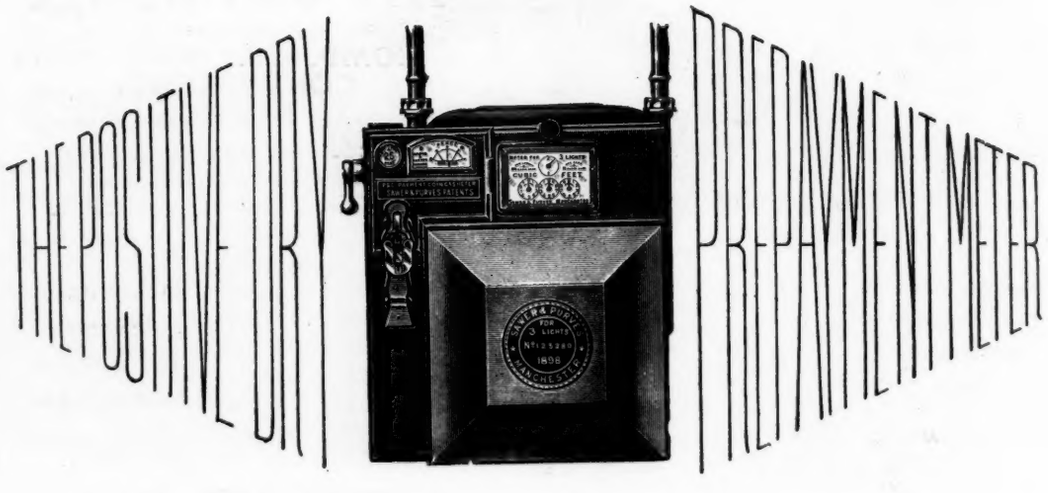

MANCHESTER & NOTTINGHAM.

and that shipments will be very heavy when they start again, in about two months' time. Again, the shortage of fuel here will considerably increase business at the briquette works. A substantial amount of pitch is being sent to Spain. Crude tar values are nominal, although business is reported at prices higher than those quoted. Creosote keeps firm without any noticeable change in quotations. Solvent naphtha is a trifle lower, and heavy naphtha is uncertain. Naphthalenes are still declining, and difficulty is experienced in disposing of crudes for the present. Demand should soon come along again, however. No revival has yet taken place in carbolic acids; there being no outlet to replace the demands for war purposes, which were more extensive than generally supposed. There is a large demand for benzol, both locally and in Ireland; and there seems no doubt that a market has been established for all that can be produced. Demand at the moment is perhaps not quite so keen as it was; but this may be accounted for by the recent fall in petrol. Benzol, however, is a far better fuel, and can readily hold its own with petrol, as I have, at the risk of becoming monotonous, many times pointed out in these reports. Other products are without change.

The range of home quotations is as follows:

Benzol: 90% London 2s. to 2s. 2d., North 1s. 11d. to 2s.; 50-90% 1s. 9d. to 2s. London, 1s. 9½d. North; crude 60-65% 1s. 3½d. to 1s. 5½d.; pure, 3s. per gallon naked.

Carbolic Acid: Crude 60's unsaleable; crystals 40%, 4d. per lb. asked.

Crude Tar: London, 44s. to 46s.; Midlands, 40s. to 42s.; North 40s. per ton *ex* works.

Pitch: London, 67s. 6d. to 70s. per ton; East Coast, 54s. to 56s. per ton, West Coast, 51s. to 53s., with Manchester 52s. per ton and Glasgow 53s. 6d. per ton; South Wales, 63s. to 65s. per ton.

Solvent Naphtha: London, 2s. Provinces average 1s. 10d. per gallon.

Crude Naphtha: Naked, 10d. per gallon.

Heavy Naphtha: 2s. 3d. per gallon.

Naphthalene: Refined, £15 to £17 per ton nominal; crude, £3 10s. to £8, according to quality.

Toluol: Naked, 2s. 9d. per gallon nominal. North 2s. 7d.

Creosote: London, 7¼d.; North, 5⅝d. to 6¼d.; heavy oil, 6d. per gallon in bulk.

Anthracene: 40-45%, 6d. to 8d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

Aniline Oil: 1s. 2d. per lb.

Cresylic Acid: 95%, 2s. 4d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 9d. *ex* works London, f.o.b. other ports.

Sulphate of Ammonia.

Trading, even in normal times, is usually slack in sulphate of ammonia at this time of the year; but this year particularly one would expect to find some revival in exports. Large shipments, however, are few and far between, and it is not expected that much will be sent away for some time. Quotations vary considerably, and late figures range from £21 to £28 per ton. Some efforts are being made to improve the quality for export. It is realized that a high ammonia value and a neutral salt mean economy in handling generally; and these qualities are bound in time to receive proper recognition by consumers. Moreover, with the keen competition of other nitrogenous fertilizers, even from the standpoint of home sales, the duty of manufacturers to produce the highest possible grades is obvious. Already the United States has tested many methods, and made much progress along these lines; and latest information from the other side is that they are now able to sell sulphate of ammonia for export down as low as £20 per ton. Another factor for consideration is German competition, which apparently will have to be faced sooner than manufacturers here anticipated, and in markets much nearer home than has been expected.

Financial Statements at Bingley.

The financial statements in regard to the Bingley gas and electricity undertakings show a loss on the year's working in both cases; but the net loss on the gas revenue account, with the inclusion of the interest on loans and repayments to sinking fund, is £1298, as against the larger figure of £1905 in the preceding year. The sales of gas have been rather less than the previous year—118,631,000 c.ft., as against 125,836,500 c.ft.—but, as a result of an increase of 1s. per 1000 c.ft. in the price of gas during the second six months of the year, the receipts increased by £2214. The cost of coal, carting, and wages is up £3883. The Committee recommended a further increase of 4d. per 1000 c.ft. in the price of gas, to take effect on July 1. It was contended by some councillors that borrowing powers should be sought for certain expenditure which the Committee proposed to meet out of revenue, including the cost of the benzol recovery plant; it being held that expenditure of this sort should be carried over a number of years. The Council accepted the Committee's recommendation, and also decided to try to obtain power to borrow £2000.

Public Lighting at Brimington.—The Whittington Gas Company have made an arrangement for the lighting of the streets of Brimington, which has been accepted. The Company agree to light one-burner lamps for £4 each, and three-burner lamps at £6 10s. each. They also ask for an allowance for unlighted lamps of 2s. each per month.

Woking District Gas Company Stock Issue.—Particulars are advertised of a sale by tender by Messrs. A. & W. Richards of a new issue of £10,000 of 5 p.c.t. redeemable preference stock in the Woking District Gas Company. The minimum price of issue is £94 per £100, at which the yield (allowing for redemption at par at the end of seven years) will be £6 2s. 7d. p.ct. Tenders are to be sent in to Messrs. Richards, No. 37, Walbrook, E.C. 4, by 11 o'clock on Friday morning, the 11th inst.

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Deficient Weights at Sheffield.

In a case which came before the local Magistrates last Tuesday, the Sheffield Gas Company were summoned in connection with thirteen offences under section 25 of the Weights and Measures Act, 1878. The offence alleged was having thirteen weights which were unjust. All but one of these weights were on the machine used for selling sulphate of ammonia. The thirteenth, it was stated, was found on a machine which "bore evidence of having been used for the sale of coke." Witnesses having been called, Mr. Ellison, for the defence, said the charges resolved themselves into two—(1) with regard to the weights in the sulphate of ammonia house, and (2) with regard to the coke department. There were a number of weights in the sulphate of ammonia house, and they were unjust. He was not in a position to dispute that the weights—no doubt owing to corrosion—had been allowed to get untrue. During the last five years, one had had a great number of different things to think about; and these matters had been neglected. No one suggested that the Company used the weights with the intention of defrauding anybody; and he did not think anyone had really suffered. Allowances were made in respect of the weight of the bags and in regard to evaporation—2½ lbs. for the weight of each bag, and 2 lbs. for evaporation, making 5 lbs., as against a deficiency of 3 lbs. 2¾ oz. The allowance was more than the deficiency. With regard to the coke weight, this had not for years been used for the purpose of trade. The coke had been sold by measure, and not by weight. The Company had not the slightest intention of committing any offence. After hearing the evidence of Mr. Walter Watson (the Manager of the Company's sulphate of ammonia department) and Mr. Luther Bates (the Superintendent of the Grimesthorpe works), the Chairman said the Bench felt there had been some neglect on the part of the Company. Fines were inflicted of £2 each on eleven of the summonses, and £5 each on the other two.

Maximum Price at Skipton.—The Skipton Urban District Council, on the recommendation of the Gas Committee, have decided to apply for an Order authorizing the increase of the maximum price for gas from 3s. 6d. to 5s. per 1000 c.ft. It has been determined also that the price to consumers be raised, and that discounts be reduced to 5 p.ct. all round; but this is not to apply until the Order has been obtained.

Electricity Supply Proposals for Tuam.—Mr. T. J. Reid, of Ballina, the owner of the Tuam Gas-Works, has intimated to the Town Board that he intends to apply for a Provisional Order in connection with the supply of electricity for all purposes in Tuam and district. The Tuam Electric Light and Power Company, recently formed, are also applying for a Provisional Order for the same purposes; and the Commissioners have decided to oppose Mr. Reid's application.

Skibbereen Gas Company's Capital.—The shareholders of the Skibbereen Gas Company have decided to increase the capital to £10,000, divided into £5 shares, to enable them to manufacture electricity for lighting—gas to be still supplied for power and domestic purposes.

Projected Gas-Works Extensions at Coventry.—The Coventry City Council are to be asked by the Gas Committee to adopt a recommendation that additional coal gas manufacturing plant be provided at an estimated cost of £425,000, and that application be made to the Local Government Board for sanction to a loan of the amount required.

Droitwich Gas-Works Deficit.—Alderman J. Gabb (the Chairman of the Gas Committee) informed the Droitwich Town Council at their last meeting that coal and wages during the past year showed an increased expenditure of £2350, as compared with 1914. These two items mainly accounted for the net deficit already reported of £508 on the year's working. The loans amounted to £2027, and the total indebtedness to £3285; and with the value of plant and stock at £20,000, and a balance in hand of £138, he regarded the position as fairly satisfactory.

Prepayment Gas-Meter Charges in Birmingham.—At the last meeting of the Birmingham City Council, Mr. Sabin moved: "That, in the opinion of this Council, the charges made to users of prepayment meters as compared with the charges made to consumers using the ordinary meters are out of proportion, and that the Gas Committee be, and are hereby, instructed to consider these charges with a view to consumers using the prepayment meters being placed upon a more equitable basis, and to report to the next meeting of the Council thereon." He said that at the last meeting his amendment to the Gas Committee's report was defeated only by 43 votes to 42. A number of the members were absent, and some had promised to change their vote on the present occasion. This was his reason for bringing the matter again before the Council. He quoted figures showing that, while the increase since March 2, 1915, to the ordinary consumers had been 1s. 3d. per 1000 c.ft., the increase to slot consumers had been 2s. 0½d., equal to an overcharge of 9½d. per 1000 c.ft. if, in 1915, the prices were correctly adjusted. Alderman Lloyd said the Committee could not accept the words of the resolution admitting that the charges were out of proportion, because they did not think they were. But they were willing to go most fully into the matter again and bring a complete report to the next meeting of the Council. Mr. Sabin, however, refused this offer. The Lord Mayor then moved, as an amendment, "That the Gas Committee be instructed to reconsider the scale of charges made to users of prepayment meters with a view to consumers using such meters being placed upon an equitable basis, and to report to the next meeting of the Council." Mr. Sabin accepted this amendment, which was agreed to. In a further report, the Committee recommend the Council to retain the 13 c.ft. for a penny, and not to increase the quantity to 20 c.ft.

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Our Architectural Manager, Major F. CORNELIUS WHEELER,
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Preliminary Advice, Suggestions, Drawings and Estimates, gratis to *bona fide* Enquirers.

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Yield of Gas at Newton-in-Makerfield.—At a recent meeting of the Gas Committee of the Newton (Lancs) Urban District Council, the Gas Engineer (Mr. R. T. Surtees) reported that during the month of May the make of the gas worked out at 20,266 c.ft. per ton of coal used. Mr. D. J. Wightman (the Chairman of the Gas Committee) said that he believed the yield at the present time was one of the best in the country by the Woodall-Duckham system of vertical retorts.

Monte Video Gas Company.—The strong financial position of the Monte Video Gas Company, and the excellent prospects which the undertaking possesses, are clearly brought out in an article appearing in the issue of the "South American Journal" dated June 21. The writer concludes his detailed analysis of the state of the Company's affairs with the remark that, "when the shares are converted into stock, it will look cheap at 67½, the equivalent of the present price of the shares; and as the prospective yield is over 9½ p.ct., a higher quotation seems assured. A report of the encouraging statement made by the Chairman (Mr. Charles Hunt) at the last meeting of the Company will be found on p. 639 of the "JOURNAL" for the 3rd ult.

Suggested Electricity Scheme for Newry.—Mr. A. E. Porter, consulting engineer, of Dublin, has reported to the Newry Urban District Council in favour of a public electric lighting scheme being worked in connection with the gas department. He estimates the capital cost at £15,026.

Smethwick Public Lighting.—Dealing with the question of contributing to the cost of public lighting, the Smethwick Gas Committee report that, since this contribution came into operation some ten years ago, the cost to the department has risen year by year from £3495 to £4641. The resumption of the full pre-war standard of public lighting, based on present-day prices, would cost the department over £8000 per annum; and the Committee are not in a position, without further increasing the price of gas, to contribute the full amount for street lighting, but are prepared to undertake a proportion of the expense, not exceeding £2500 in one year, the remaining portion to be chargeable to the rates. The annual statement of accounts of the department shows a net surplus of £1175 on the year's working, allocated as follows: Public lighting, £1061; Free Library, £50; depreciation and extension fund account, £64.

STOCK MARKET REPORT.

THE Stock Exchange settled down last week to work full time and full pressure. But not much came of it. The start was very fair, with bright points here and there; but it was not long before things began to droop, movements were irregular, and business became slack and dull. The assurance that the signing of Peace, so long unreached, would positively become a *fait accompli* on Saturday, left markets cold.

In the gilt-edged division, Home Government issues were practically unchanged; the 5 p.ct. Loan opening and closing at 94 and Consols at 53½, though with intermediate fluctuations. Bonds were firm. But Indians and Colonials were put down, and Bank stock was lower. Home Rail ordinaries were rather better; but the prior charges were not restored to favour. Canadians also ruled easy, labour troubles casting a shadow; but Argentines showed more strength. In the Foreign Market, French Loans slowly amended their position at first, but fell back somewhat before the close. Greek Loans advanced; but the prevailing tone among the rest was adverse.

In the Miscellaneous Market, there was more interest. Rubber drooped; but Oils were strong and active, and marked firmness was observable in Meat concerns, Breweries, and Shipping.

Business in the Gas Market continues to be upon a most reduced scale. Not half-a-score of undertakings were dealt in at all, and some of these exhibited the now frequent feature of one solitary transaction. Movements were irregular. In the Metropolitan companies, Gas Light ordinary marked lower prices; but the quotation stood unchanged. The maximum and debenture quotations, however, were both lowered. South Metropolitan was 1 lower, but Commercials were not dealt in. In Provincials, Newcastle receded 2. In Continentals, European increased its recent gains, and changed hands up to 15 3/16. Imperial Continental was active and strong at first, rising from 139 on Monday to 146½ on Tuesday. From this point it fell back partially, and the last mark was 141. In Primitivas, the ordinary was unchanged; but the preference made a jump on Friday up to 72s. 6d.

Bargains done for cash during the week were as follows: On Monday, Continental Union 48, Gas Light ordinary 56, 57½, 58, 58½, ditto maximum 55, ditto debenture 55, Imperial Continental 139, 140, 142, 142¼, 142½, 143, 143½, 146, Monte Video 13½, Primitiva preference 62s. 6d., 63s. 1½d., ditto debenture (1911) 51, South Metropolitan 60. On Tuesday, Gas Light ordinary 57½, 58½, ditto preference 70½, 71, ditto debenture 54¾, Imperial Continental 145, 145¼, 145¾, 146, 146½, Primitiva 37s. 6d., ditto debenture (1911) 51½, Sheffield "A" 84, ditto "C" 73, Southampton 67. On Wednesday, European 14¾, 14¾, 15, Gas Light ordinary 58, 58½, ditto preference 70, Imperial Continental 143, 144, 145, Primitiva preference 62s. 6d., South Metropolitan 60. On Thursday, European 15, 15⅛, 15 3/16, Gas Light ordinary 58, 58½, Imperial Continental 141, 142, 143, 144, South Metropolitan 59. On Friday, European 15, Gas Light ordinary 58, 58½, ditto debenture 53½, Imperial Ordinary 141, Primitiva 35s., ditto preference 70s., 72s. 6d., ditto debenture (1911) 51, South Metropolitan 59, 59½, 60¼, South Suburban 77½, Southampton 68½.

In the Money Market, rates opened and continued easy until midweek, when they became stiffer; but they soon fell back again, and closed quite easy. The Bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Shares.	When Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
123,049	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	62—67	..
1,551,868	"	April 5	2½	2⅞	Alliance & Dublin Ord.	59—64	56-60	..
274,000	"	July 10	4	4%	Do. 4 p.c. Deb.	76—79	61—63	..
330,000	5	April 29	7½	8%	Bombay, Ltd.	5½—6⅜	6¾—6½	..
50,000	10	Feb. 26	16	12%		29—30	20—23	..
868,110	10	"	7	7%	Bournemouth Gas and Water { £8 p.c. B 7 p.c.	15—15½	10½—11½	..
115,000	10	"	6	6/-	Pref. 6 p.c.	13½—14	9½—10	..
159,740	—	June 27	—	4%	4 p.c. Deb.	..	65—67*	..
999,945	Stk.	Feb. 26	14	37/-	Brentford A Consolid.	261—266	74—77	..
784,290	"	"	11	31/3	Do. B New	204—209	68—71	..
55,000	"	"	5	5%	Do. 5 p.c. Pref.	109—111	78—83	..
231,400	"	June 11	4	4%	Do. 4 p.c. Deb.	91—98	64—66	..
214,775	"	Feb. 26	11	7½%	Brighton & Hove Orig.	205—218	137—142	..
944,309	"	"	8	6⅔%	Do. A Ord. Stk.	154—159	94—99	..
923,500	Stk.	"	5	5%	Bristol 5 p.c. max.	..	..	..
580,000	20	Mar. 26	12½	10%	British	44—45	80½—81½	..
190,000	Stk.	June 27	4	4%	Do. 4 p.c. Deb. Stk.	88—90	63—65*	..
945,771	"	"	4	4%	Buenos Aires 4 p.c. Deb.	85—87	60—58*	..
100,000	10	—	—	—	Cape Town & Dis., Ltd.	1½—2½	5½—6	..
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	7—7½†	..
100,000	Stk.	June 27	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	61—66*	..
157,150	"	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	..
1,518,980	"	Feb. 12	5/9/4	80/-	Commercial 4 p.c. Stk.	108—108	62—65	..
660,000	"	"	5½	26/8	Do. 3½ p.c. do.	108—106	58—61	..
475,000	"	June 11	8	8%	Do. 3 p.c. Deb. Stk.	69½—71½	50—52	..
800,000	"	"	4	—	Continental Union Ltd.	76—79	48—53	48
200,000	"	"	7	—	Do. 7 p.c. Pref.	115—118	70—75	..
51,600	Stk.	Aug. 29	14½	12½%	Croydon A 10 p.c.	..	155—165	..
278,400	—	"	11½	9⅜%	Croydon B and C 7 p.c.	..	130—135	..
492,370	Stk.	—	6	6⅔%	Derby Con. Stk.	123—125	..	..
55,000	"	—	4	4%	Do. Deb. Stk.	103—104	..	..
1,009,180	10	July 29	10	5/0	European, Ltd.	17½—18	14½—15½	14½—16 7/16
16,298,975	Stk.	Feb. 10	4/17/4	80/-	Gas Light and Coke { 4 p.c. Ord.	98—102	57—59	56—58⅛
2,600,000	"	"	3½	26/8	3½ p.c. max.	76—79	54—56	55
4,062,285	"	"	4	4%	4 p.c. Con. Pref.	96—99	70—72	70—71
4,674,850	"	June 11	8	8%	8 p.c. Con. Deb.	72½—74½	53—55	53½—55
130,000	"	"	10	10%	10 p.c. Bonds	..	..	..
82,500	Stk.	Mar. 13	5	4⅓%	Hastings & St. L. 5 p.c.	..	59—64	..
258,740	"	—	3½	2⅞%	Do. 3½ p.c	37—39	44—49	..
70,000	10	April 29	11	7%	Hongkong & China, Ltd.	16½—16¾	7—8	..
66,600	Stk.	Sept. 12	9	8⅓%	Hornsey 7 p.c.	..	115—120	..
181,900	"	Mar. 13	7½	6⅔%	Ilford A and C.	151—154	90—95	..
65,780	"	"	6½	4⅓%	Do. B	115—118	69—74	..
65,560	"	June 27	4	4%	Do. 4 p.c. Deb.	92—94	61—64*	..
4,940,000	"	May 14	9	4½%	Imperial Continental	150—160	140—145	139—146½
1,325,000	"	Feb. 12	8½	8½%	Do. 8½ p.c. Deb. Red.	84—86	79—81	..
235,949	"	Mar. 12	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	90—95	..
2,496,906	"	Feb. 26	10	42/6	Liverpool 5 p.c. Ord. { A B	211—215 / 146—148	..	..
806,088	"	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	..	..
165,736	"	Feb. 17	7/5/6	35%	Maidstone 5 p.c.	..	58—63	..
75,000	5	June 11	5	3%	Malta & Mediterranean	4½—4¾	3½—3¾	..
350,000	100	April 1	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99—101	90—97	..
541,230	20	May 19	4	5%	Monte Video, Ltd.	11½—12	13—14	13½
1,876,892	Stk.	July 29	4½	3½%	Newcastle&Gateh'd Con.	96½—99½	66—67	..
539,705	"	June 26	3½	3½%	Do. 3½ p.c. Deb.	84—88	57—59	..
15,000	10	Mar. 13	—	11%	North Middlesex 10 p.c.	..	13½—14	..
55,940	10	"	7/14/0	7%	" 7 p.c.	14—15	9½—9¾	..
900,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	101—104	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7¾	4¾—5½	..
60,000	50	Feb. 26	18	7½%	Portsea, Island B	128—131	76—81	..
100,000	50	"	12	6⅔%	Do. C	118—121	68—63	..
949,980	5	April 29	8	—	Primitiva Ord.	5½—6	1½—2	35/—37/6
499,960	5	June 26	5	—	Do. 5 p.c. Pref.	4½—5	3—3½	62/6—72,6
631,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91—98	71—73	..
600,000	Stk.	July 31	4	4%	Do. " " 1911	..	49—52	..
846,198	"	June 27	4	4%	River Plate 4 p.c. Deb.	86—87	49—55*	..
150,000	10	May 14	6	6/-	San Paulo { 6 p.c. Pref. 5 p.c. Deb.	10½—11	7½—8	..
125,000	50	July 1	5	5%		47—49	41—43	..
185,000	Stk.	Mar. 12	10	5%	Sheffield A	228—234	82—86	84
209,984	"	"	10	5%	Do. B	229—234	82—86	..
528,500	"	"	10	4⅔%	Do. C	220—225	71—74	73
188,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c.	..	..	..
90,000	10	June 27	9	10%	South African	10½—11½	12½—13¾*	..
6,609,895	Stk.	Feb. 10	5/4/0	50/-	South Met. 4 p.c. Ord.	111—113	59—61	59—60½
250,000	"	July 12	—	5%	Do. Pref.	..	96—98	..
1,895,445	"	July 10	5	5%	Do. 3 p.c. Deb.	72½—74½	54—56	..
224,890	"	Feb. 26	5½	5⅓%	South Shields Con. Stk.	156—160	99—101	..
962,796	"	"	6	5⅓%	S'th Suburb'n Ord. 5 p.c.	114—116	76—79	77½
167,562	Stk.	June 27	6	5%	Do. 5 p.c. Deb. Stk.	118—118	88—91*	..
647,740	"	May 14	7½	8%	Southampton Ord.	99—102	67—69	67—68½
121,275	"	June 27	4	4%	Do. 4 p.c. Deb. Stk.	..	63—65*	..
150,000	"	Feb. 12		4⅔%	Tottenham { A 5 p.c. B 3½ p.c.	125—128	90—96	..
762,275	"	"	6	5%		115—117	63—66	..
181,265	"	June 26	4	4%	4 p.c. Deb.	87—89	64—66	..
189,880	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
296,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	103½—109	88—95	..
80,000	"	Feb. 26	8½	55/-	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	151—156	88—93	..
255,686	"	"	6½	40/-	Do. B 3½ p.c.	129—134	68—73	..
108,075	"	"	—	38/6	Do. C	..	68—73	..
140,865	"	"	—	38/6	New Ordinary	..	68—73	..
353,000	"	"	6½	38/9	Wimbledon 5 p.c.	117—122	68—73	..
98,000	"	"	6½	40/-	Epsom 5 p.c.	121—126	70—75	..
88,416	"	June 27	8	8%	8 p.c. Deb. Stk.	45—50	49—51*	..

* Ex Div. † Ex Arrears.

Monte Video Gas Company, Ltd.

An extraordinary general meeting of the Company was held at the Offices, Dashwood House, New Broad Street, E.C., last Wednesday, for the purpose of considering the following resolutions, which were adopted at a previous extraordinary meeting on May 28: "(1) That the name of the Company be changed to 'The Montevideo Gas and Dry Dock Company, Ltd.' (2) That the regulations contained in the printed document submitted to the meeting, and for the purpose of identification subscribed by the Chairman thereof, be, and the same are hereby, approved, and that such regulations be, and they are hereby, adopted as the Articles of the Company in substitution for, and to the exclusion of, all the existing Articles thereof." These resolutions were passed unanimously, as also was a further one for the conversion of the shares into stock transferable in multiples of £1.

Hebden Bridge and Mytholmroyd Gas Board.

The 23rd annual report of the Hebden Bridge and Mytholmroyd Gas Board states that the gross profit is £4652, and the net profit, after making the usual allowances for interest, &c., £73, compared with £1067 a year ago. The stock issued and other capital borrowed amounts to £104,300, towards the liquidation of which £39,580 has been set aside. The total profits from the date of the taking over of the undertaking from the Gas Company are £3499; and £1800 of this has been distributed to the two District Councils owning the works. Altogether £59,481 has been set aside out of revenue; and the total capital expenditure to date is £119,466. The Manager (Mr. T. H. Nield) considered the working results satisfactory, under the prevailing conditions. The coal carbonized shows a remarkable decrease of 1133 tons; but the cash has been £180 more. In order to save as much coal as possible, the water-gas plant has been used a great deal; and since September, 1918, the charges in the vertical retort installation have been regularly steamed. Restrictions due to the Household Lighting and Fuel Order and daylight saving have again had an appreciable effect on the sale of gas. The total increase in wages during the year amounts to over £1900.

Increase in Price at Derby.—The Directors of the Derby Gas Company have increased their charges 4d. per 1000 c.ft. to those consuming less than 500,000 c.ft. per quarter. The charges for meters and cooking-stoves have also been raised.

Dearer Gas and Electricity at Shipley.—The Shipley District Council have decided to increase the charge for gas from 5s. 2d. to 5s. 5d. per 1000 c.ft., subject to a discount of 2d. They have also substantially advanced the price of electricity.

Meltham Gas-Works Deficit.—The Meltham (nr. Huddersfield) District Council have advanced the price of gas 5d. per 1000 c.ft., to date from the meter readings for June. The past year's working showed a loss of £208, which was more than accounted for by the extra cost of 5s. 4d. per ton for coal.

Price of Gas at Burnley.—The Gas Committee of the Burnley Corporation have decided that, as soon as an Order is made by the Local Government Board authorizing the Corporation to increase their charges for gas to a maximum of 4s. 6d. per 1000 c.ft., the necessary steps be taken to raise the price of gas 8d.—making it, within the borough, for motive power 3s. 6d., for ordinary meter consumption 4s 2d. and for prepayment meters 19 c.ft. for 1d.

The gas workers at Milan are reported to have struck work for higher wages.

The East Hull Gas Company are offering for sale by tender £15,000 of 5½ p.ct. debenture stock. The last day for the receipt of tenders is July 26.

At a meeting of the Manchester City Council to-morrow (Wednesday), on the application of the Gas Committee, a resolution will be submitted that the Local Government Board be asked to confer upon the Corporation power to borrow a further sum of £1,000,000 for the gas undertaking.

Mr. Leonard Truscott has been appointed by Messrs. Willey & Co., Ltd., to assist Mr. John H. Roby, by representing them north of a line drawn across Morecambe Bay to Bridlington. Mr. Truscott was repatriated early this year from Germany, being taken prisoner in May, 1918, after active service in France and Belgium since 1914.

The Airdrie Town Council have decided to introduce the "A. & M." [Alder & Mackay] patent pressure wave automatic controllers for the street lighting in the town, to the extent of 350 lamps. Also the Darvel (Ayrshire) Town Council have decided to instal for the next lighting season sixty "A. & M." controllers for their street gas lighting.

So far, holders of 89·6 p.ct. of the issued shares in John Wright and Eagle Range, 94·5 p.ct. in the Richmond Gas Stove and Meter Company, and 96·8 p.ct. in the Davis Gas-Stove Company have exchanged their holdings for shares in Radiation Ltd. The equivalent shares in Radiation Ltd. have been allotted; and shareholders in the combining Companies will receive their certificates for shares in the new Company in due course.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for June 25.]

Nos. 15,052—15,693.

CLIMIE, W.—"Gas-producers." Nos. 15,536, 15,538.
COKE AND GAS OVENS, LTD.—"Coke-ovens." No. 15,613.
DELLWIK, C.—"High-temperature reducing operations." No. 15,318.
DELLWIK, C.—"Heat treatment of carbonaceous material." No. 15,573.
FRANKLIN, J.—"Suction-gas generators." No. 15,295.
HESLOP, A. J.—"Device for controlling passage of fluid through pipes, &c." No. 15,661.
IONOFF, L.—"Gas-Regulator for incubators." No. 15,415.
KNIGHT, J.—"Means of utilizing heat from spent gases of internal combustion engines." No. 15,255.
M'EWEN, S.—"Carbonization or destructive distillation." No. 15,324.
MARSHALL, C. H.—"Bye-pass, pressure-regulating, &c., valves." No. 15,138.
RAILING, M. J.—See Marshall. No. 15,138.
ROCK, W. D.—"Extracting hydrocarbons from coal, &c." No. 15,272.
ROLLASON, A.—"Production of ammonia." No. 15,149.
SANDERSON, J.—See Heslop. No. 15,661.
TECHNO-CHEMICAL LABORATORIES, LTD.—See Dellwik. Nos 15,318, 15,573.
TULLIS, D. R.—"Combustion." No. 15,423.
UNDERFEED STOKER CO.—See M'Ewen. No. 15,324.
WOODHOUSE, A. E.—"Valves, cocks, &c." No. 15,330.

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